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Effect of conflict incidences on vulnerability to food insecurity in Oyo State, Nigeria

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Abstract: Despite several concerted efforts made at eradicating hunger by the world leaders, it still persists. The dynamism of food insecurity remains a major drawback at capturing the hungered by the various interventions. Hence, the world still experiences acute food insecurity, mostly prevalent in Sub-Sahara Africa and the Asian. Fluctuation in weather elements and conflicts are two major factors where hunger is prevalent. This calls for policies that will address the dynamism, fluctuations in weather as well as conflict incidences. These are feasible when *ex ante* studies are done. There is perceived insufficient data for making of such policies in the study area. Hence, this study analysed the effect of conflict incidence on vulnerability to food insecurity in Oyo State, Nigeria. The population of the study were registered farmers with the Oyo Agricultural Development Programme. The data was collected during two visits (April through early June and September through December of the year 2019) using a multistage random sampling procedure. The data were analysed using three staged feasible generalized least square regressions (at 5% probability) following the Value at Risk (VaR) approach. The result indicated that the majority of the farmers (63.37%) were of their active age having mean age of 49 years and majorly smallholders with a mean farm size of 3.75 hectares. Dynamism in food insecurity status was established 53.48% and 13.55% of the households moved in and out of food insecurity respectively (an indication of dynamism) while about 68.50% of households were not vulnerable to food insecurity, 31.50% of them were vulnerable to food insecurity. In the same vein, 59.71% of the households experienced conflict while about 40.29 % of the households do not. In the study area, 66.84% of the households that did not experience conflict were not vulnerable while 33.16% were vulnerable to food insecurity. Also, 55.81% of the households that experienced conflict were vulnerable to food insecurity. Lastly, a unit increase in conflict incidence have the probability of increasing vulnerability to food insecurity by about 19.4%. In conclusion, dynamism in food insecurity was established while a positive significant relationship exists between conflict incidence and vulnerability to food insecurity. This therefore calls for *ex ante* analysis to enhance efficiency of interventions aimed at eradicating hunger in the study area. Measures aimed at eradicating conflict incidence and compensation of affected farmers should also be put in place to stem vulnerability to food insecurity in the study area.
Keywords: Food insecurity, vulnerability, dynamism, and conflict.

INTRODUCTION

By the year 2050, it is estimated that the world's population would have at least doubled, and the purchasing power of the populace increased. The implication of this will be an increase in the demand for food that is currently insufficient (United Nations, 2009). According to Jensen (2002) food is not only a global fuel for powering humans, but also a basic requirement for maintaining political stability in the economy and for ensuring a peaceful coexistence amongst the populace. Thus, it creates a needful environment that enables governments achieve their developmental objectives. This is because, a hungry man is often referred to as an angry man who may at the slightest provocation, take to violence or somewhat illegal or unwholesome activities Jensen (2002). Cantor *et al.,* (1985) also established a strong link between lack of food, unemployment, and crime rate.

Going by the report of the Food and Agricultural Organisation in the last quarter of 2017 where 51 nations were surveyed, almost 125 million people were faced with what the organization described as acute food insecurity. This represents an increase of 11 million people from the same quarter of the previous year (FAO, 2017). From the same report, there was an 11% increase in the occurrence of food insecurity at various levels especially in Northern Nigeria (FAO, 2017). This figure is expected to either remain relatively constant or soar higher given the prevailing conflict and harsh weather conditions in this region except some emergency measures are taken to ameliorate the situation.

At present, about one billion people of the world's population still suffer from chronic hunger out of which about (25%) are from Sub-Sahara Africa due to factors ranging from, unavailability, inability to afford food because of the prevailing weather, conflicts, extreme poverty, spirally increasing prices of foods, food materials to bad government policies, (FAO/World Food Program, 2018).

Evidence of conflicts in Nigeria

The era of conflict in the Nigerian setting started with the merger of the Northern and Southern Nigeria in 1914 by the British empire, to discourage the would-be ethnic conflicts borne out of inter-regional migration. The new influx to these parts were encouraged to stay in a separate colony called Sabon-Gari and Sango in the Northern and Southern parts respectively (Ray, 2012). This however solved or stemmed the expected conflicts howbeit temporarily as the separation enhanced competition for resources among these settlements. Thus, the

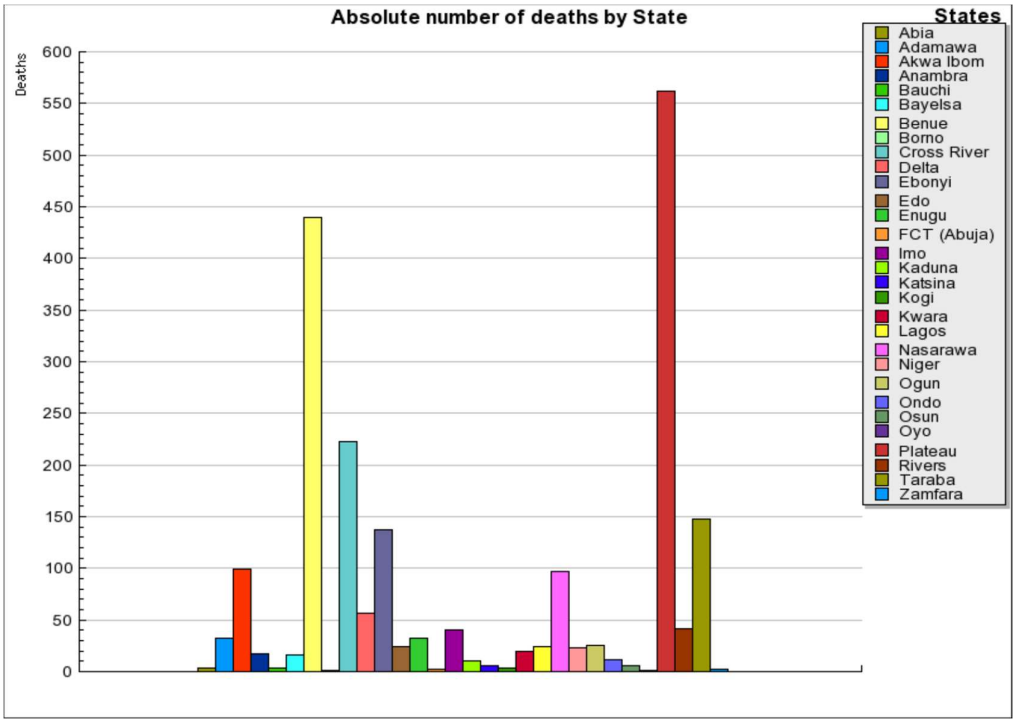
stage was set for what will later translate into unending conflict in the country (Osaghae *et al.,* 2005).

Following the independence of the country in the year 1960, conflicts ensued between these ethnic groups in no distance time, leading to the overthrowing of the nation's first democratic government in not more than six years, it started, this was followed closely by the Biafran war in year 1967. Since then, inter and sometimes intra-ethnic (for example Ife versus Modakeke conflict of mid 90's in Southwest Nigeria and between Tiv and Jukun in the middle belt) conflicts of one kind had been the order of the day (Bah *et al.,* 2003). The prolonged conflict ravaging the Northern part has been the Boko Haram insurgence, while the middle belt is being bedevilled by the farmers and Fulani herders' crises and, indeed, some scattered incidences of the conflict across the federation. (Osaghae *et al.,* 2005).

The background to most of these conflicts has been the struggle to control economic resources, notably land and water (Fabusoro *et al.,* 2014). Territorial establishment over these resources makes land and water-related conflicts difficult to control relative to other forms of conflicts (Olabode, and Ajibade, 2010). Blench (2003) established that, pastoralists-farmer conflicts got escalated in recent times due to genetics improvement culminating in increasing herd size that necessitates more grazing land requirement, exploding population that drives demand for food items thereby necessitating the need for cultivation of more lands.

The inception of Fadama farming along the prized resource for Cattles, water, further escalates the problem (Blench, 2010). This could be partly responsible to why the conflict is more concentrated in the middle belt region where the landscape has a big river (river Benue) supplying water for crop growth and cattle consumption. For instance, Benue state accounted for 58.4% of violent deaths stemming from land issue in the country between June 2006 and May of 2014 (Bah *et al.,* 2003). Furthermore, Bah *et al.,* (2001) identified rapid desertification in the Northern part (the primary homes of these nomads) and harsh weather condition as a result of weather change as contributing factors to the migration of these pastoralists southward.

Figure 1.2 shows the number of violent deaths between June 2006 to May 2014 because of land conflicts between communities at the state levels. Plateau State tops the chart with more than 550 deaths, followed by Benue State with close to 450 deaths. The Plateau conflict was due to land tussle between Islamic group and communities while Benue State was due to conflicts between farmers and pastoralists. The conflicts of south-south states were due to communities against the oil companies.



Number of deaths from Violent Conflicts in Nigeria (Stone, 2014)

Finally, in the work of Olomojobi (2017) where he examined the newspaper coverage of the farmer-herders conflicts in Nigeria from the month of January 2015 to August 2016, the incidence is a

nationwide phenomenon with diverse degrees of frequency, the North Central (24.2 %) having the highest frequency of reportage by the three newspapers analysed by the author, followed by the South West (16.9%), and closely by South East (15.5%), while the South- South recorded 6.1%. This is in spite of the oil exploration in the region polluting its waters and which makes it land area unfit for arable crop growth, the most sought-after resources by herders, North West and East were least with the same frequencies (3.5%). This could be due to inaccessibility of the regions because of another form of intense conflict between the Nigerian army and the Boko haram insurgent. About 30.0% of the incidences do not have their locations reported, while numerous unreported or undocumented cases were also suspected by the authors.

The Concept of conflict

There had been many concentrations on civil and inter-state wars in the more recent years. Conflicts are really of different forms, notable are political forms, this although this is only common just before and after major electioneering, rioting by perceived aggrieved groups in the society (except that this could distort food distribution channels, it is mostly an urban- related problem), organized crimes form, and communal conflict form. The later having an extension to farmers and herders or Pastoralists and is majorly caused by struggle to control agricultural productive resources, notably, land and water (World Bank, 2011).

Although the conflict has multidimensional causes, acute food insecurity is usually a general motivating factor for participating in conflicts. The other popular cause is the desire to get revenge for perceived wrongs (Stewart, 2010 and Centre for Systemic Peace, 2012). The relationship between conflict and food security is usually nuanced in that food insecurity enhances the occurrence of and participation in conflict (usually communal) while, dampening This is because in curbing insurgencies and civil conflicts, restriction of access to food by the opposition is often employed (Downes, 2007).

A notable and prevalent instance of this is the Boko Haram insurgence that has been ravaging the North Eastern parts of Nigeria for almost a decade now. Conflict remains one of the major drivers of food insecurity today (World Food Program, 2018). Conflict (civil) is perhaps an exclusive occurrence in developing nations and is common only amongst the food insecure. (Collier *et al.,* 2003) established a strong linkage between chronic food insecurity, conflict, and poverty.

Food insecurity was discovered at individual and community levels to enhance participation in conflict. Based on the premise that, fighters are usually recruited by warring rebels through incentives (usually food and shelters), appeal and coercion (Arjona and Kalyvas 2012). In the case of armed conflict, in which farmers' herders' conflicts are an example, revenge and grievances are often not sufficient reasons for participation. Needed resources (both materials and partisan humans) need to be mobilized, the cost of the arms and ammunitions often suggests that the participants are food secure or at best, have sponsors who either coerced or incites them (Tilly 1978, Collier and Hoeffler, 2004).

In communal conflicts however, weather change causes crop failures while farming land invasion by herders to eat up remnant of the failed crops cause grievances on the part of the farmers. However, a generally declining income because of this menace makes willing donors of money and materials for use for armed conflicts become more difficult to come by for farmers and thus could also motivate resistance to coercion. (Roble, 2011). The pressing need for food security rather than political fulfilment that could precipitate conflict becomes the preoccupation of the individuals (Maslow 1984, Salehyan and Hendrix, 2012).

From the preceding discussion, high food prices often result from violence or conflicts and thus make the availability, accessibility, and affordability of food very difficult for the populace, resulting in food insecurity. Lack of enabling environment for farming operations in the case of communal and farmers-herders conflicts makes proper attention to farms almost impossible, consequently reducing yields and increasing mortality in livestock farming, the gross aftermath of which is the erosion of farmers' income and food insecurity (United Nations 1993). Scanlan and Jenkins, 2001) established an increase in government spending in peace keeping at the expense of investments in infrastructural development and economic growth that will drive food security and prosperity for the populace.

Conflict as a shock on rural households causes death, the effect of which is more devastating if the death is of the economically productive household members (like household head or male adults) because this tends to reduce the household's income, enhances the spread of diseases due to restricted access to health personnel and facilities as a result of reduced or low household income, displacing households as evident in increasing number of Internally Displaced Persons (IDPs) camps and the population of people therein, and discouraging investment in agriculture because the primary motive would be survival rather than investment, all of which negatively affects food security (Collier, 2003).

Pathways to weather-induced conflict

Figure 2 shows a complex relationship between weather change, food insecurity and conflicts. An adverse change in weather increases the rate of natural disasters like flooding, drought,

desertification, and increasing scarcity of productive resources (land, water, and sunlight). These result in loss of means of sustainability (loss of source of livelihood, be it cropping or livestock production) thus, causing food insecurity. To correct this anomaly, migration must be the ultimate coping strategy when other strategies have failed. Migration to greener pasture characterized by resource availability, (like fresh water for livestock and arable land for crops and pastures). The new entrants to this new colony cause population pressure on these resources, and there will be stiff opposition to these intruders, resulting in economic instability and an incentive to organise and participate in all conflicts.

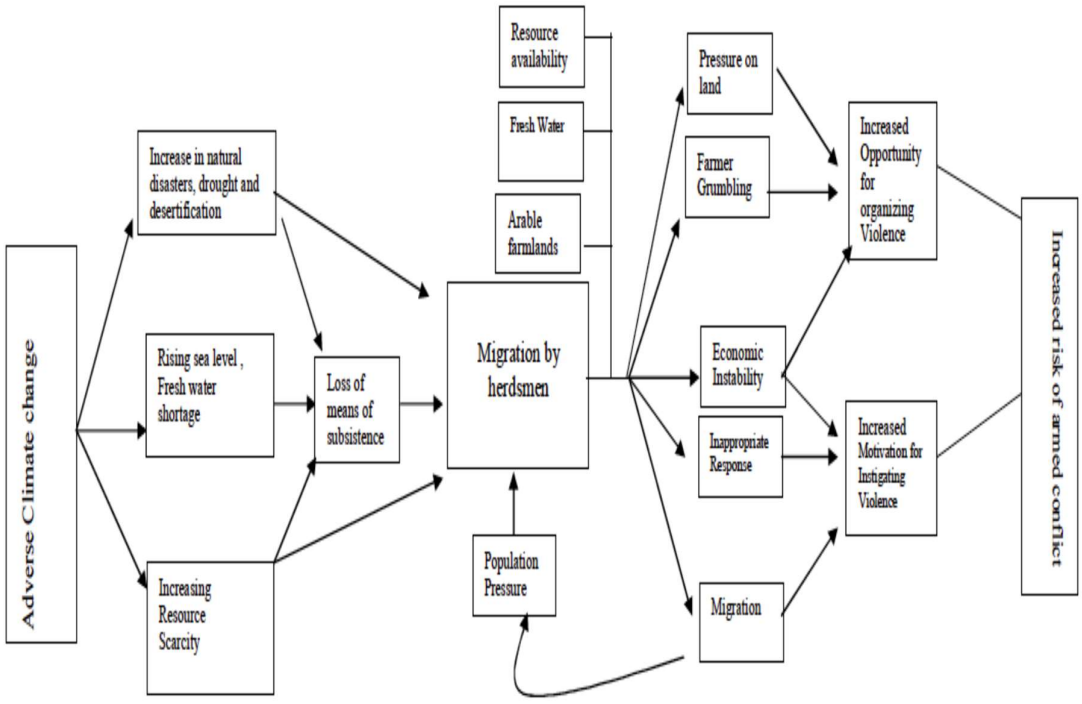


Figure 2: Pathways to weather-induced conflict (Adopted from Odoh, 2012)

Objectives of the study

1. Analysis of socio-economic characteristics of the respondents.
2. Estimation of vulnerability to food insecurity of the respondents.
3. Determination of effect of conflict incidence on vulnerability to food insecurity.

METHODOLOGY

Study area

The study area is Oyo State, Nigeria. The state was created in 1976. It currently has 33 Local Government Areas. The state shares boundaries with Kwara, Osun, and Ogun States to the North, East, and South respectively and with the Republic of Benin to the West.

The State covers 28,454 square kilometres and is ranked 14th (relative to size) in the country. It is located on latitude 8.1196^0N, 3.4196^0E, having an equatorial weather condition, with distinct dry and wet seasons and relatively high humidity. Being in a temperate region, it has a daily temperature range of 25-35 ^{0}C which is almost the year-round. These conditions favour the cultivation of various arable crops such as Yam, Cassava, Maize, Cocoa, and Cashew. Oyo State is culturally the home of the Yorubas, though almost all people of other languages in Nigeria live, work, or trade there. (Ndianefor, 2016).

Data Source, Population, Sampling Technique and Sample Size

Primary data were used, collected during two visits to the respondents using a structured questionnaire. The first visit was done during the planting season; April to early June, and the second, during the harvesting season July to December, year 2019. The population is comprised of all the registered farming households with Oyo State Agricultural Development Program (OYSADEP). (415,030 households). A multi-staged sampling procedure was used. The first stage was a purposive selection of two agricultural zones (Saki and Ogbomoso zones) out of the 5 in the State, followed by purposive selection of 8 Local Government Areas

LGAs from the two zones (3 from Saki and 2 from Ogbomoso zone) based on some desirable characteristics such as being agrarian area. This was followed by random selection of the farming households.

The selected zones were Saki zone with 119,313 households and Ogbomoso zone having a population of 90,413 households, this makes a total of 209,728 households. Population size of 290 was determined using the table of sample size determination. Over the two visits, a total of 17 household's data were incomplete, this could be due to relocation of the households that might have been occasioned by conflict or a search for a greener pasture elsewhere. In this regard, 273 households were used as the sample proportionately spread across the zones and LGAs randomly as thus: Oriire (66), Surulere (49), Atisbo (38), Saki West (31), Iwajowa (29), Kajola (22), Ogo-Oluwa (21), and Saki East (17).

The profiling of the socio-economic characteristics was achieved using descriptive statistics as frequency count, mean and percentages. In estimating vulnerability to food insecurity, two staged feasible generalized least square regression following Value-at-Risk VaR approach was used as used by (Oyelade *et al*, 2022, Sileshi *et al*., 2019, Sisay *et al*., 2016, Capaldo *et al*., 2010, Scaramozzino 2006) using the model:

$$\tilde{V}_{ht} = \Pr(\text{In } C_h < Z / X_h = \phi \frac{In\ Z - Xh\beta}{\sqrt{Xh\theta}}$$

where $\ln c_h$ is defined as $X_h\beta + \epsilon$ and $\tilde{V}_{ht}$ is the probability of vulnerability, C_h, per capita consumption of the households, Z, ideal consumption, X_h, household characteristics, β, vector of parameters to be estimated, and ϵ_h is the error term that captures idiosyncratic shocks.

The effect of conflict on vulnerability to food insecurity was estimated using three staged feasible generalized least square regression because it is suspected that there could be a problem of endogeneity, thereby leading to a correlation between an endogenous variable and the error term. Two endogeneity tests (residual and Hausman) were conducted to confirm endogeneity. This necessitated using three staged least square regressions, though ordinary least square may be consistent, it will not be efficient in this case.

VaR in the context of food security can be construed relative to the critical threshold level of the nutrition outcome consistent with a minute (given) probability of such an outcome falling below this level at a particular time. However, sensitivity analyses must have been done prior to choosing the confidence interval level for the classification because a higher confidence interval could be associated with increased food security or reduced food insecurity. Therefore, this approach can greatly help in suggesting custom-built approaches of specific households, reducing such a household's vulnerability to food insecurity (Chaudhuri, 2000), and (Scaramozzino, 2006).

The explanatory variables of the household's heads used were; X_1 = Gender (1 for Male and 0 for female) X_2 = Age (years), X_3 Household size, (absolute number), = X_4 = Primary occupation, X_5 = Level of education measured by years of schooling, X_6 = Farmland Ownership, X_7 = Farm size, X_8 = Farming Experience, X_9 = Membership of political or cooperative society (1 if Yes and 0 if No), X_{10} = Access to Weather information, X_{11} = Livelihood Diversification, X_{12} = Time spent to get water, Dependency ratio (number of household member below age 18 years and above 70 years), Expenditure of household on food items in Naira, Access to remittance (1 if Yes and 0 if No), Access to external credit (1 if Yes and 0 if Not), Time spent in fetching water, X_{13}= Time spent to Access Healthcare, X_{14}= Indebtedness, X_{15}= Farming income, X_{16} = Dependency Ratio, X_{17} = Conflict Incidence (1 if an household experienced either farmer-herders conflict (farm, water source or community invasion by herders), land leaser-leasee conflict, or communal land conflict at least once in the last 2 months, 0 if otherwise)

RESULT AND DISCUSSION

Socio-economic Characteristics of the Respondents

Table 1 presents the socio-economic characteristics of the respondents. Saki and Ogbomoso zones have a proportionate distribution of 50.18 and 49.82 percent, respectively. Across Oyo state, the minimum age recorded was 29 years, while the maximum was 78 years, and the mean age was 49 years. It shows that the respondents are young adults with vigour demanded by agricultural operations. This result was like the findings of Oluwasusi and Tijani (2013).

From the table, the mean farm size of the respondents was 3.75 hectares, which implies that the respondents are predominantly small-scale farmers. A similar finding was made by (Amao and Ayantoye, 2017), where an average farm size was 3.5 hectares. Also, the average household size obtained was 5 individuals, while the maximum and minimum sizes were 13 and 2 individuals, respectively. The reason for a relatively lower mean size could be rural-urban migration waves, increased use of chemicals that reduce human labour demand, and aggressive birth control campaigns.

Finally, 163 households, representing 59.71% of the households surveyed, did not experience any of the earlier identified forms of conflict, while 110 households, representing 40.29% did experience one form of conflict or the other.

Table 1: Socioeconomic characteristics of the respondents

Variables	Frequency	Percentage	Mean	Min.	Max.
Agricultural zone					
Saki	137	50.18			
Ogbomoso	136	49.82			
Age (years)			48.97	29	78
<=30	5	1.83			
31-40	65	23.81			
41-50	103	37.73			
51-60	52	19.05			
61-70	34	12.45			
Above 70	14	5.13			
Farm size (hectares)			3.75	0.5	30
Not more than 5	225	82.42			
6-10	43	15.75			
Above 10	5	1.83			
Household size			5	2	13
Not more than 5	95	34.80			
6-8	152	55.68			
Above 8	26	9.52			
Conflict incidence					
Experienced conflict	110	40.29			
No conflict experienced	163	59.71			
Vulnerability statuses					
Vulnerable	86	31.50			
Non-vulnerable	187	68.50			
Total	**273**	**100.0**			

Vulnerability to food insecurity

Table 2 presents the household's food vulnerability status in the study area. While 31.50% of households were vulnerable, 68.50% were not susceptible to food insecurity. This is not in tandem with Mesfin's (2015) findings, where 52% and 48% of households were vulnerable and non-vulnerable to food insecurity, respectively in his study. Inferentially, not minding the current food security status, given a minimal disturbance of the prevailing socio-economic characteristics and conflict incidence, 31.50% of households have a higher chance of becoming food insecure.

The table as well gave the statuses of food insecurity across the planting and harvesting seasons, these statuses were found to be non-static but dynamic. A similar finding was reported by Christina, Miller, Swanson, and Strawderman (2005). Across the seasons, 17.95% of the households maintained the status of being food insecure (the vulnerable in the coming season), while 15.02% of the households as well-maintained food secure status. However, in the report of Amao and Ayantoye (2015), higher percentage of surveyed households (86.8%) remained food insecure across harvesting and planting seasons. Contrarily, 53.48% households changed status from being food insecure to being food secure across the planting and harvesting seasons while 13.55% of the households' changed status from being food secure to being food insecure (the vulnerable) in the study area. The latter is like the findings of Amao and Ayantoye (2015) where 13.1% of the households moved from being food secure to becoming food insecure.

Table 2. Vulnerability to food insecurity

Food security status	Vulnerability Status		
	Vulnerable (%)	Non-vulnerable (%)	Total
Food insecure (P_x $H_{x)}$	49 (56.98)	0 (0.0)	49 (17.95)
Food Secure P_x, H_x	0 (0.00)	41(21.93)	41 (15.02)
Food Insec. P_x, Food Sec H_x	0 (0.00)	146 (78.08)	146 (53.48)
Food Sec P_x, Food Insec H_x	37 (43.02)	0 (0.00)	37 (13.55)
Total (%)	86 (31.50)	187 (68.50)	273 (100)

Source: Field Survey 2019. P_x and H_x represent planting and harvesting seasons respectively.

Distribution of vulnerability status based on conflict incidence

Relative to conflict incidence, table 3 presents the results of the distribution of the respondents. Households that experienced one form of conflict or the other have vulnerability percentage of 55.81 of the vulnerable households. However, 44.19% (households of those that do not experience conflict) were vulnerable. This implies that,

exposure or experience of any form of conflict increases vulnerability to food insecurity.

The table also shows that, 66.84 percent of the households that do not experience any form of conflict were not vulnerable while only 33.16 percent of the households that experienced conflicts were non vulnerable. Again, this index shows that, non-exposure to conflict increases non vulnerability percentage among the respondents in the study area. This is in consonance with the findings of Mesfin (2015).

Table 3: Distribution of vulnerability status based on conflict incidence

Variables			Vulnerability Status
Conflict Incidence	**Vulnerable (%)**	**Non-vulnerable (%)**	**Total (%)**
Experienced Conflict	48 (55.81)	62 (33.16)	110 (40.29)
No Conflict Experienced	38 (44.19)	125 (66.84)	163 (59.71)
Total (%)	**86 (31.50)**	**187 (68.50)**	**273 (100)**

Source: Field Survey 2019

Estimation of Vulnerability to Food Insecurity

Table 4 presents the result of estimation of vulnerability to food insecurity status of the respondents. The FGLS result as presented showed some variables as age, household size, primary occupation, conflict incidence (all positives), years spent in schooling, ownership of farmland, weather information access, and livelihood diversification (all negatives), are significant to vulnerability to food insecurity status in Oyo State.

Given the result, as the age of the household head increases by a year, the probability of vulnerability increases by 2.9%. This is in agreement with the report of Sisay *et al*., (2016). In the same vein, increase in household size by one individual will increase food vulnerability by 8.5%, Capaldo *et al*., (2010) reported a similar result, probably because, increase in household membership creates more burdens on the limited economic resources of the households. Also, as the household's head primary occupation tends towards civil service, there is probability of vulnerability to food insecurity to increase by 4.0 percent, somewhat negating apriori expectation that Civil servants with secure and stable source of income should be relatively food secure, this could be due to erratic payment of the civil servant's salary at the time.

As the year spent in school increases by a year, probability of vulnerability to food insecurity decreases by 29.9 percent. High educational attainment is expected to enhance modern technology adoption that will drive agricultural productivity and reduce vulnerability to food insecurity, according to Sisay *et al*., (2016). Furthermore, an increase in farmland ownership by one hectare stands the chance of reducing vulnerability to food insecurity by 41.6 percent, a possible explanation being that farmland remains a major factor of production in agriculture that, if owned, positioned the households at a vantage position to be food secure, Mesfin, (2014) and Ojoko (2017).

A unit increase in weather information access has probability of reducing vulnerability to food insecurity by 30 percent, probably because access to requisite and location/crop specific weather information could assist the households with better decision making for optimum productivity Ogundari (2017). Increase in livelihood diversification of the households by a unit could reduce food vulnerability to insecurity by 37.7 percent probably because, the more the sources of income the more likely the households will have means of providing for their food needs hence reduction in vulnerability, also, the more the livelihood sources, the likely their low correlation and then the lesser their riskiness, hence the lesser the chance of being vulnerable to food insecurity (Mesfin, 2014).

Finally, a unit increase in conflict incidence can increase vulnerability to food insecurity by 16.9 percent. This agrees with the findings of Sisay *et al*., (2016). This could be because, conflict incidence has been shown to negatively affect food production, accessibility and distribution, three of the four core indices of food insecurity (the last which is probably unaffected being food utilisation). Communal land conflict, for instance, reduces farmers' access to farming resources such as land and water, and herders' farm invasion leading to the destruction of farms and loss or reduction of harvest from the farm, Human Rights Watch. (2013). Agricultural farm input merchants and produce buyers or middlemen in a bid to avoid casualty do avoid conflict or conflict-prone areas, thus affecting the normal input-output channel; this has a negative effect on the agrarian economy, increasing the chance of vulnerability to food insecurity (Hoddinott**,** 2004)

Table 4. Estimation of Vulnerability to Food Insecurity

Variables	OLS Regression			FGLS Regression		
	Coefficient	Std. Error	t	Coefficient	Std. Error	t
Sex	-0.0195554	0.0746051	-0.26	0.1195776	0.1171433	1.02
Age	0.0044475	0.0033837	1.31.	0.0288885	0.0053824	5.37***
Household Size	0.0775619	0.0159504	4.86***	0.284767	0.0249808	11.40***
Pry Occupation.	0.0541485	0.0258982	2.09**	0.1749754	0.0394694	4.43***
Year spent in School	-0.0061797	0.0061144	1.01	-0.0299459	0.0094976	-3.15***
Land Ownership	-0.1092052	0.0646574	-1.69*	-0.4158631	0.0974893	-4.27***
Farm Size	0.0122928	0.0093978	1.31	0.017638	0.0140619	1.25
Farming Experience	-0.0014	0.0033663	-0.42	-0.0077064	0.0052609	-1.46
Political participation	-0.014917	0.0546788	-0.27	-0.0513928	0.0840175	-0.61
Access to weather info	-0.0777718	0.0574329	-1.35	-0.2797171	0.0881701	-3.17***
Livelihood Diversification	-0.1076363	0.0300849	-3.58***	-0.3764947	0.0511909	-7.35***
Time to get Water	-0.0012816	0.0027126	-0.47	-0.0038878	0.0041962	-0.93
Tim to get healthcare	0.0002649	0.001021	0.26	-0.0002013	0.0016496	-0.12
Debt Status	-0.0360627	0.0346582	-1.04	0.0214578	0.0943708	0.23
Farming Income	-6.86e-09	1.90e-07	-0.04	4.44e-07	2.92e-07	1.52
Dependency ratio	0.0237407	0.1415243	0.17	0.198094	0.2173094	0.91
Conflict incidence	0389654	0.0563317	0.69	0.1692495	0.0874005	1.94***
Constant	0.1181766	0.2251312	0.52	-2.162502	0.3546052	-6.10***

R^2 = 30.4 69.8
Observation = 273
Source: Field survey 2019
***significant at 1 percent, ** significant at 5 percent and significant at *10 percent

CONCLUSION AND RECOMMENDATIONS

The study examined the effect of conflict incidence on vulnerability to food insecurity in Oyo State. It concluded that conflict incidence has a significant positive relationship with vulnerability to food insecurity in Oyo State. Thus, adequate measures should be taken to address all forms of agricultural-related conflicts, such as farmers-herders and communal and land lease disputes in Oyo State. A mechanism should be put in place to compensate the affected farmers and reduce their vulnerability to food insecurity. Identified areas of further studies include investigating the determinants of vulnerability to conflict in Oyo State. The effect or impact of each form of the identified conflicts could be investigated in isolation.

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Assessment of socioeconomic profile of micro-finance beneficiaries' small-scale rice processors in Jigawa State of Nigeria

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ABSTRACT
The present study assessed the socioeconomic profiles of micro-finance beneficiaries' small-scale rice processors in Jigawa State of Nigeria given that there is no exclusive study on socio-economic characteristics of these agribusiness entrepreneurs that benefitted from credit facilities in the study area. The study utilised cross-sectional data elicited through a well-structured questionnaire coupled with interview schedule from 200 processors (133 parboilers and 67 millers) selected through a multi-stage sampling technique. Besides, an easy cost-route approach was used for data collection during the 2022 processing period, and data analysis was achieved using descriptive statistics. The empirical evidence showed the enterprises to be dominated by an economically active labour force that is well experienced, literate and had a sustainable household size for a better livelihood. However, the challenges of gender stereotypes and discrimination, and the climate threat that owed to the use of black energy were visible. Therefore, the study recommends the need for gender budgeting for the purpose of supporting gender mainstreaming, and provision of cheaper and eco-friendly energy technologies as a substitute for fossil fuel energy technologies in use.
Keywords: Agripreneur, Processors, Rice, Socio-economic, Smallholder, Jigawa State

INTRODUCTION
Jigawa State, located in northern Nigeria, is characterized by a predominantly agricultural economy (Sadiq and Bashir, 2022), with small-scale rice processing playing a crucial role in the region (Sadiq and Bashir, 2023). Small-scale rice processors, often operating at the grassroots level, contribute significantly to local employment, income generation, and food security (Adam *et al*., 2018; Abiodun *et al*., 2019). In their pursuit of sustainable business operations, many of these entrepreneurs rely on financial support from micro-finance institutions (Phuknoi *et al*., 2018; Akpan *et al*., 2020; Ndubuisi and Chidimma, 2023). Jigawa State, Nigeria, is a region with a significant presence of small-scale rice processors who play a crucial role in the local economy. These micro-entrepreneurs often rely on micro-finance institutions for financial support to sustain and expand their rice processing businesses. While micro-finance has been recognized as a catalyst for economic empowerment and poverty alleviation, there is a paucity of comprehensive studies examining its impact on the socio-economic profiles of small-scale rice processors in Jigawa State. This background underscores the need for a detailed assessment that goes beyond traditional economic indicators to encompass a holistic understanding of the conditions, challenges, and opportunities faced by micro-finance beneficiaries within this specific sector. Besides, the current lack of a detailed understanding of the socio-economic dynamics within this specific demographic hampers the development and implementation of targeted policies and initiatives. Consequently, there is a pressing need to comprehensively assess the socio-economic profiles of these micro-finance beneficiary small-scale rice processors in order to identify challenges, opportunities, and potential areas for intervention.

To address this gap, a focused study on the socio-economic profiles of micro-finance beneficiary small-scale rice processors in Jigawa State is imperative. By addressing these key issues, the study aims to provide a comprehensive understanding of the socio-economic profiles of micro-finance beneficiary small-scale rice processors in Jigawa State. To sum it up, the study is justified as it addresses critical issues related to poverty alleviation, inclusive growth, rural development, and the effectiveness of micro-finance in supporting small-scale rice processors. The findings of this study will contribute valuable insights for policymakers, micro-finance institutions, and other stakeholders, enabling them to formulate targeted strategies that will enhance the overall economic well-being of this vital sector. In other words, the insights gained from this research have the potential to inform policies, improve financial inclusion, and contribute to the overall well-being of the local communities involved in rice processing. Noteworthy, the findings will not only contribute to academic knowledge but also have practical implications for policymakers, development practitioners, and local communities in Jigawa State, Nigeria.

METHODOLOGY
Jigawa State is in the North-Western part of Nigeria (Figure 1). The State has a total land area of approximately 22,410 km^2 or 2.2 million hectares and lies between latitude 10^0 57' North to 13^0 03'North and Longitudes 8^0 08' East to 10^0 37'East (Nigeria Information Guide (NIG), 2004). The State has a population of 4,361,002 people according to National Population Commission (NPC, 2006) while the projected population in 2019 at 2.9%

growth rate stood at 6,005,100. Eighty-five per cent of the population of the State lives in rural areas (Mamman, 2016). According to Jigawa State Government Official Directory of information (2017), Jigawa State's topography is characterised by undulating land, with sand dunes of various size spanning several kilometres in parts of the State. Most part of Jigawa State lies within the Sudan savannah vegetation zone with elements of Guinea savannah in the southern part. The state is endowed with fertile arable land to which almost all tropical crops could adopt, thus constituting one of its highly prized natural resources. Farming is among the major occupation of the people who are predominantly Hausa/Fulani (Jigawa State Diary, 2017). Out of the 4,361,002 people, about 90% of the population are predominantly engaged in rural and subsistence farming *viz*. arable crop production, livestock rearing etc. The State economy is largely characterised by informal sector activities with agriculture as the major economic activity.

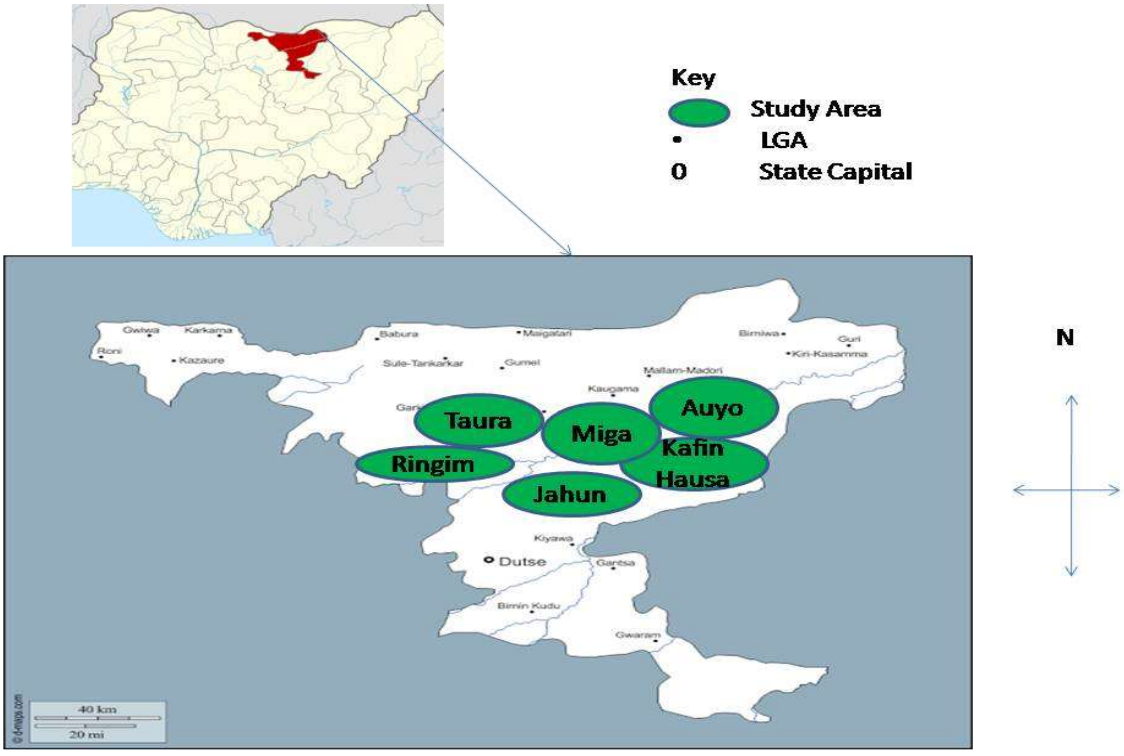

Figure 1: Map of Jigawa State showing Study Area

Using a multi-stage sampling technique, a total of 200 processors were selected for the study based on the sampling frame obtained from both reconnaissance survey and the state's agricultural agencies. The first stage involved purposive selection of three (3) Agricultural zones *viz.* Zone 1, 2, and 3 based on high concentrations of rice production/farming in the study area. The second stage involved random selection of two Local Government Areas (LGAs) from each of the selected zones. The chosen LGAs were Miga and Jahun; Ringim and Taura; and, Kafin-Hausa and Auyo from Zone 1, 2 and 3 respectively. The third stage involved random selection of three villages from each of the selected LGAs, thus given a total of Eighteen (18) villages. The random selection of the LGAs and villages was done *viz*., inbuilt Microsoft sampling tool. In the fourth stage, the sampling frame was stratified into two target groups: millers and parboilers: using Taro Yamane formula (1967) (Equation 1) as adopted by Ndubuisi (2023), 200 respondents were randomly drawn from the sampling frame (Table 1). Afterward, a simple random sampling technique was used to select the representative sample size from each of the strata (133 parboilers and 67 millers). Using an easy cost-route approach, a well-structured questionnaire coupled with an interview schedule was used to elicit information from the respondents and after which descriptive statistics was used to analyse the data.

Table 1: Sampling Procedure and Sample Size

Zone	LGA	Village	Sampling frame		Sample size	
			Parboiler	Miller	Parboiler	Miller
Zone 1	Miga	TSakuwawa	15	7	8	4
		Hantsu	10	11	5	5
		Gwari	8	9	4	5
	Jahun	Harbosabuwa	13	6	7	3
		Harbotsohuwa	18	10	9	5
		Agufa	15	8	8	4
Zone 2	Ringim	Sintilmawa	21	9	11	4
		Yan-Dutse	18	8	9	4
		Yakasawa	19	6	10	3
	Taura	Maje	11	10	6	5
		Gilma	10	6	5	3
		Majiya	12	4	6	2
Zone 3	Kafin-Hausa	Bulangu	11	7	5	4
		Kafin-Hausa	13	6	6	3
		Baushe	19	5	9	2
	Auyo	Arawa	21	5	10	2
		Gatafawa	17	10	8	5
		Ayama	14	7	7	4
Total = 3	6	18	265	134	133	67

Source: JARDA, Co-operative Society, Micro Finance Bank, and Reconnaissance survey (2019)

$$n = \frac{N}{1 + N(e)^2} \quad \text{---------- (1)}$$

Where:
n = sample size
N = population size
e = level of precision or Giant of tolerable error (5%)

RESULTS AND DISCUSSION

Age distribution of paddy rice processors

The results in Table 1 revealed that the majority (75.2%) of the parboilers and 65.7% of the millers were within the age range of 30-39 years old. This implies that most of the processor falls within the active and economic age range recommended by FAO (2019) to be productive and economically viable. Besides, the enterprise population is youthful compared to the previous situation that characterised the enterprise population to be dominated by early ageing people. The implication is that under a favourable business climate, the enterprise stands to benefit from efficient labour productivity, a catalyst for the enhancement and sustainability of the up and downward supply chain streams and rice food security in the study area. In addition, it could be assumed that the processors would be rational in making decisions and choice regarding their enterprises.

Household size distribution of paddy rice processors

The distribution of household size showed majority of the processors to have a fair household size of an average six (6) persons representing 42.1 and 47.8% respectively for parboilers and millers. Therefore, it can be suggested that both the actors in the rice value chain maintained a sustainable households which is healthy for a decent and favourable or good standard of living, Besides, this shift in the old norms of maintaining large households owing to culture and belief might be attributed to positive yield of sensitisations by stakeholders on the importance of a rational household size for healthy economic and society growth and development in the study area in particular and the nation in general. More so, literacy as evident from the fair to good level of formal education play a crucial role in the drive towards achieving this sustainable household size among most of the processors in the study area.

Furthermore, the implication is that the processors are likely to face little or no population pressure on their economic wherewithal, thus enhancement in the business going concern of these actors in the rice value chain of the study area. This result disagreed with the findings of Ibitoye (2014) who reported large households among majority of the rice processors in his study area. However, these findings conform to the findings of Tondo (2015) who discovered small households among most the rice processing actors in his study area. had a household size between 4 and 6 persons respectively. The result implies there is high dependency ratio and can be assume that food expenditure in non - food expenditure increases with increase in household size, and this could influence their income inequality in their enterprises.

Experience distribution of paddy rice processors

The distribution of the small-scale rice milling, and parboiling experience presented in Table 1 indicated the mean experiences of parboilers and millers to be 8 and 7.66 years respectively. The implication is that most of the processors have been in the milling and parboiling enterprises for quite some time, thus have adequate experience required for managerial efficiency. Therefore, it can be suggested that both the actors in the rice value chain had adequate years of experience vital for competitive turnaround of the downstream supply chain. Besides, it is expected that these actors should be efficient and rational in resource allocation, thus strengthen both the upstream and downstream supply chain of rice enterprise in the study area. Year of experience in parboiling and milling is important because management skills of processors improve with experience thorough understanding of the technical procedures of doing the business profitably and proper utilisation of credit. This s finding is supported by Oyediran and Wasiu (2016); and Adam *et al*. (2018) who in their various studies indicated that most of the rice processors in their study areas had plentiful years of experience in rice processing activities.

Table 1: Age, Household size, and processing experience of the sample Processors (n= 200)

Variable	**Respondents' category**					
	Parboilers		**Millers**		**Pooled**	
Age	**Frequency**	**%**	**Frequency**	**%**	**Frequency**	**%**
<20	6	4.5	5	7.5	11	5.5
20-29	50	37.6	16	23.9	66	33
30-39	50	37.6	28	41.7	78	39
40-49	18	13.5	16	23.9	34	17
50-59	8	6.0	2	3.0	10	5
>=60	1	0.8	-	-	0.5	0.5
Min	14		17			
Max	60		50			
Mean	31.37		33.03			
Std. Dev.	8.895		8.562			
Household Size						
1-3	27	20.3	13	19.4	40	20
4-6	56	42.1	32	47.8	88	44
>=7	50	37.6	22	32.8	72	36
Min	**1**		**1**			
Max	**13**		**20**			
Mean	**5.90**		**5.81**			
Std. Dev.	**2.724**		**3.412**			
Years of processing experience						
1-3	11	8.3	14	20.9	25	12.5
4-6	57	42.9	20	29.9	77	38.5
>=7	65	48.8	33	49.2	98	49
Total	**133**	**100**	**67**	**100**	**200**	**100**
Min	**1**		**1**			
Max	**30**		**22**			
Mean	**8.08**		**7.66**			
Std. Dev.	**5.338**		**5.163**			

Source: Field survey, 2022

Gender distribution of paddy rice processors

Gender is a socially constructed roles, behaviours, and attributes that a given society consider appropriate for masculine and feminine. It also refers to the natural segregation of human race in to male or female. Sex roles are those functions which are naturally bestowed on an individual to perform. The analysis in Table 4 showed that

females constituted majority (87.2.7%) of the parboiling enterprise with fewer males of 12.8% which implies that parboiling enterprise was dominated by females in the study area. The result agrees with the findings of Ibitoye (2014) who reported that female constitute most of the rice processors with fewer males but disagrees with the findings of Tondo *et al.* (2015) who revealed that male constituted majority of the rice parboiling processors in their study area. The result of the millers indicated that majority (98.5%) of the rice millers were males with 1.5% females, thus an indication that the milling enterprise is male dominated in the study area. The result is in tandem with the findings of Adam *et al.* (2018) who revealed that most of the milling processors were males in their study area. The high number of males might be attributed to the relative strenuous nature involved in using processing machines and purchasing of raw paddy rice in distance local markets.

Marital status distribution of paddy rice processors

The result of the parboilers in Table 2 indicated that majority (73.7%) of the parboilers were married, while 7.5% were single. This implied that most of the parboilers had families to cater for, which subject them to more liabilities and likely to discourage them to save more as the income of individual is spent on his family consumption. For the millers, evidence showed majority (85%) to be married while 13.4% found to be single. These results agreed with the findings of Saleh *et al.* (2016) and Shuaibu *et al*. (2018) who in their various studies reported that most of the rice processors in their study area to be married. Akerele and Ambali (2012) opined that marital status determined the level of farmers' household size with likely consequences on the family labour availability, income composition, household expenditure, saving pattern and as well as the enterprise going concern.

Educational distribution of paddy rice processors

In Table 2, the results revealed that that majority of the parboilers (54.1%) had Quranic education while 45.9% had one form of formal education. Contrarily, most (58.2%) of the millers had various forms of formal education while 41.8% didn't exceeds Quranic education. Therefore, it can be suggested that the milling categories were more informed educationally contrary to the parboilers in which the margin is just barely one-third. Besides, milling enterprise is technically inclined or involved intensive technologies unlike the parboiling enterprise that is technically passive. Consequently, the processors with formal education are more likely to take incisive decision that affects their enterprises compared to those with little or no formal education as the case maybe. This is supported by the fact that educated processors will relies on market information- feed forward and backward: input and output supply markets, credit sources, globalisation as a guide for their enterprise's operational activities. Nevertheless, the technical know-how among most of the millers if adequately harnessed will strengthen the downstream rice supply value chain due to pecuniary advantage of economies of scale and size of milling industry compared to parboiling industry. However, in line with Adam *et al. (*2018), it can be argued that given the low level of post-secondary education across the parboiling and millers supply value chain actors, hence the rate of adoption of processing technology, information, and management of their income management. The implication is that processing innovation especially among the parboilers will have reception but with doubt as a low level of education is a characteristic of the adoption category of early majority adoption category. This result disagreed with the findings of Rifftat *et al.* (2018) who observed most of the rice millers in their study area not to have formal education. Similarly, in a general scenario, Adam *et al.* (2018) reported that most of the rice processors in their study area had no formal western education.

Membership of Association Distribution of the Rice Paddy Processors

The results in Table 2 revealed that most of the parboilers and millers vis-à-vis 73.7 and 68.7% respectively did not belong to any form of social association, while on few 25.6 and 28.5% respectively for the parboilers and millers joined social association. The consequence of this poor utilisation of social power among most of these actors, a vital instrument of capital/investment boost given that economic power is presumed to be almost absent/lacking, is that, the pace of sustainability of the rice supply value chain in terms of growth and development in the study area is under a serious threat which if not properly addressed will have toll long-run effect on the study area's rice food security. It is assumed that being in a group or association can enhance processors' ability to improve their processing activities because one of the important obligations of member of association or cooperate society is acquiring loan collectively, sharing of ideas, experience and other technical skills. Generally, these results disagreed with the submissions of Oyediran and Wasiu (2016) who reported that majority of the paddy rice processors in their study area belonged to the rice processing association.

Table 2: Gender, Marital Status, Educational Status, and Membership Association of the Sample Processors (n= 200)

Variable	Parboilers		Millers		Pooled	
Gender	Frequency	%	Frequency	%	Frequency	%
Female	116	87.2	1	1.5	117	58.5
Male	17	12.8	66	98.5	83	41.5
Marital Status						
Single	10	7.5	9	13.4	19	9.5
Married	98	73.7	57	85.1	155	77.5
Widow	12	9.0	-	-	12	6.0
Divorce	13	9.8	1	1.5	14	7.0
Educational Status						
Quranic	72	54.1	28	41.8	100	50
Primary	28	21.1	12	17.9	40	20
Secondary	27	20.3	21	31.3	48	24
Tertiary	5	3.8	4	6.0	9	4.5
Others	1	0.8	2	3.0	3	1.5
Mem. Association						
Yes	34	25.6	23	34.3	63	31.5
No	98	73.7	44	65.7	137	68.5
Total	**133**	**100**	**67**	**100**	**200**	**100**

Source: Field Survey, 2022

Major occupation distribution of paddy rice processors

The analysis in Table 3 showed that majority (59.4%) of the parboilers engaged in agro processing as their major occupation, 36.8% engaged in trading, 2.3% in farming, and 1.5% in formal employment. On the other hand, majority (68.7%) of the millers take to milling as their major occupation, 17.9% in farming, 11.9% in trading and 1.5% as casual worker. The implication is that more time will be devoted to the rice supply value chain in the study, thus a plus to the growth and development of this sector. Besides, credit given to the paddy rice processors will be utilised for the purpose of the processing. Despite rice processing being the major occupation, these actors tends to diversify into other augmenting income generating activities, thus enhancement of their livelihoods and the turnover ratio of the rice processing enterprises in the study area. These results are in line with the findings of Abdulazezz *et al.* (2012); Muhammad (2014); and Tondo *et al.* (2015) who in their various studies established processing to be the major occupation of most of their respondents.

Secondary occupation distribution of paddy rice processors

The findings of the study in Table 4 discovered that majority (47.8%) of the parboilers were engaged in trading; 39.8% in agro-processing; while in a marginal proportion, 8.3, 5.3 and 3% respectively take to casual work, farming and formal employment. For the milers, it was observed that majority (49.3%) of the respondents engaged in farming activities; distance followed by 23.9% that engaged in agro-processing; 17.9% engaged in trading while a marginal proportion of 7.5 and 1.5% respectively keyed into casual and formal employments. . The results implication explained that paddy rice processors in the study area had other means of livelihood and sources of income to sustain their processing activities. These results agreed with the findings of Riffat *et al.* (2018) who found rice processors in in their study to be engaged in subsidiary occupations that include, sewing sacks, sewing clothes, livestock rearing, and working in the neighbour household as a temporary servant.

Source of credit distribution of paddy rice processors

The analysis revealed that the majority (67.2%) of the millers acquired their start - off capital through Bank credit, and then followed by 20.9% that sourced their finance from friends and relatives; while 7.5, 3 and 1.5% sourced got their capital take-off from savings, co-operatives and inheritances (Table 3). Further, evidence showed that most (39.1%) of the parboiler used personal savings for capital take-off; and then followed by 28.6% each that acquired their take-off capitals from banks and friends and family; while at a distance, 2.3% and 0.8% respectively got their capital take-off from co-operatives, inheritances and money lenders (Table 3). The implication is that the characterised capital intensiveness of the milling industry forced most of the milling actors to resort into banking loan for a capital take-off against their counterparts in the parboiling chain that is less capital intensive, thus mostly utilised personal savings as start-up capital. Besides, it can be suggested that micro finance Bank

credit contributed immensely to the take-off of milling industry in the study area. Generally, these results disagreed with the findings of Abiodun *et al.* (2019); Oyediran and Wasiu (2016) who in their various studies reported that majority of the rice processors in their study areas respectively used their personal savings and cooperatives as capital sources.

The operational scale distributions of paddy rice processors

The results showed most of the actors in the value chains of parboiling and milling vis-à-vis 75.2 and 80.6% respectively operated on small-scale basis while few across the selected value chains operated on mini/micro level. Based on economic theory, both are presumed to be faced with diseconomies of size but in a typical traditional economic setting as suggested by Shankayan (1988); Subba et al. (2015), a small-scale firm stands a better position to explore the advantages of economies of scale against the marginal/mini scale firm. Generally, this result contradicts the findings of Nasiru (2016) who reported that groundnut processing in his study area, though a distinct enterprise but similar supply value chain was small-scale dominated.

Table 3: Major occupation, secondary occupation, sources of finance and scale of operation of the sample processors

Variable	Parboilers		Millers		Pooled	
Major Occupation	**Frequency**	**%**	**Frequency**	**%**	**Frequency**	**%**
Farming	3	2.3	12	17.9	15	7.5
Trading	49	36.8	8	11.9	57	28.5
Formal Employment/Casual	2	1.5	1	1.5	2	1.0
Casual					1	0.5
Agro-Processor	79	59.4	46	68.7	125	62.5
Secondary Occupation						
Farming	7	5.3	12	17.9	39	19.5
Trading	58	43.6	8	11.9	70	35.0
Formal Employment	4	3.0	1	1.5	6	3
Casual	11	8.3	46	68.7	16	8.0
Agro-Processor	53	39.8	10	-	69	34.5
Source of Finance						
Friend And Relative	38	28.6	14	20.9	52	26.0
Co-Operative	3	2.3	2	3.0	5	2.5
Inheritance	1	0.8	1	1.5	2	1.0
Saving	52	39.1	5	7.5	57	28.5
Money Lenders	1	0.8	-	-	1	0.5
Banks	38	28.6	45	67.2	83	41.5
Scale of operation						
Mini/Micro Scale Opera	13	24.8	33	19.4	46	23.0
Small Scale Operation	54	75.2	100	80.6	154	77
Total	67	100	133	100	200	100

Source: Field Survey, 2022

Sources of processing power supply distribution of paddy rice processors

The result shows that majority (99.2%) of the parboilers used firewood as their sources of energy for paddy rice processing, while 0.8% used diesel as their energy source (Table 4). This implies that firewood served as the major source of energy for parboiling process. However, the result of the millers was different as 100% of the respondent's used diesel as their energy source for the milling enterprise. This implies that diesel was the only applicable and available energy source for rice milling as electricity supply in the study area is limited. This result disagreed with the findings of Akpan *et al.* (2020) which reported that most of the millers their study area used firewood as energy source for steaming.

Sources of paddy rice distribution of the paddy rice processors

The result in Table 4 indicated that the majority (41.8%) of the respondents sourced their paddy rice from the local markets, followed by 26.9% from individuals, 17.9% from owned farms, and 13.4% from the research institutions. Further, the findings of the millers revealed that 52% of the respondents which is the majority sourced their paddy rice from the local markets, 23.5% from individuals, 18.0% from owned farms and 6.5% from the research institutions. This implies that local market is the de facto source of raw material for the rice supply value chain in the study area. In addition, the market serenity of rice in the study area being competitive will help to contain price imperfection to some reasonable extent, thus strengthen the rice supply value chain of the study area. Generally,

these results disagreed with the findings of Abiodun *et al.* (2019) who reported that most of the rice processors their raw materials from the middlemen. Though a distinct enterprise but a similar value chain, these agreed with the findings of Nasiru (2016) who identified local market to be the major source of raw material for processors in a ground supply value chain in his study area.

Sources of labour supply distribution of paddy rice processors

The result of the millers in Table 4 showed that majority (67.5%) of the respondents used family and hired labour for their milling enterprise, followed by 26.5% that used family labour only, and fewer (6.0%) that used only hired labour. Also, for the parboilers it was observed that majority (68.4%) of the respondents used family and hired labour, 26.3% used family labour only, and 5.3% used only hired labour for their parboiling enterprise. This implies that household size was paramount or significant for the contribution of family labour for the paddy rice processors and these results agreed with the findings of Nasiru (2016) who revealed that groundnut processing in his study area relied heavily on hired and family labour.

Credit utilisation distribution of paddy rice processors

The result revealed that majority (95.5%) of the parboilers utilised all their credit in their parboiling enterprise while 4.5% failed to utilise all their credit in the enterprise. While in the case of millers, majority (97.0%) utilised their credit while few (3.0%) failed to judiciously utilise the credit advanced for the milling purpose. The implication is that the purpose advanced credit of the financial intermediaries was not diverted, thus the viability of the rice value supply chain in the study area given the little or no risk of default and delinquency of the credit repayment liquidity. Besides, these value chain actors in the study can be said to be credit trustworthy. However, the possible reason might be associated with the stable/steady and flourishing marketing of rice in the study area, thus contained the risk of credit diversion which is a common feature of smallholder entrepreneurs in a typical agrarian setting.

Annual income classification of paddy rice processors

The results of the income distribution among the parboilers revealed that most (92.5%) of the respondents had an annual income of less or equal to half a million naira while few (7.5%) had an annual income of greater than half a million naira. Furthermore, for the millers, it was observed that majority (56.7%) had an annual income of more than half a million while 43.3% had an annual income of less or equal to half a million naira in the study area. Therefore, from the foregoing and given the economies of size, it can be suggested that paddy rice processing enterprise is lucrative in the study area, thus justifies the facts that most of the processors (millers and per-boilers) used the proceeds gotten from the business to support their families. These results conform with the findings of Saleh *et al*. (2016); Akpan *et al.* (2020) who in their various studies suggested agro-processing enterprises to be a lucrative industry in their study areas.

Table 4: Sources of power supply, sources of paddy distribution, sources of labour credit utilisation and annual income of the sample processors

Variable	Parboilers		Millers		Pooled	
	Frequency	%	Frequency	%	Frequency	%
Sources of power supply						
Diesel	1	0.8	67	100	68	34.0
Firewood	132	99.2	-	-	132	66.0
Total	**133**	**100**	**67**	**100**	**200**	**100**
Sources of paddy Rice Dis						
Local Market	76	57.1	28	41.8	104	52.0
Owned farm	24	18.0	12	17.9	36	18.0
Research institute	4	3.0	9	13.4	13	6.5
Others	29	21.8	18	26.9	47	23.5
Total	**133**	**100**	**67**	**100**	**200**	**100**
Sources of Labor						
Family Labor	35	26.3	18	26.9	53	26.5
Hired Labor	7	5.3	5	7.5	12	6.0
Family and Hired Labor	91	68.4	44	65.7	135	67.5
Total	**133**	**100**	**67**	**100**	**200**	**100**
Credit Utilisation						
Yes	127	95.5	65	97.0	192	96.0
No	6	4.5	2	3.0	8	4.0
Total	**133**	**100**	**67**	**100**	**200**	**100**
Annual Income Classification						

Variable	Parboilers		Millers		Pooled	
	Frequency	%	Frequency	%	Frequency	%
< 100000	17	12.8	2	6.4	34	17.0
>=100000	40	30.1	7	15.4	95	47.5
>=200000	39	29.3	11	20.4	48	24.0
>=300000	21	15.8	23	34.3	19	9.5
>=40000	11	8.3	19	18.7	4	2.0
>=500000	5	3.8	5	4.8	-	-
Total	133	100	67	100	200	100

Source: Field Survey, 2022

CONCLUSION

Based on the findings, it was suggested that the enterprise is dominated by able-bodied men that have reasonable educational level and maintained a sustainable household size. Besides, they have adequate experience, thus a possible catalyst that makes them to be efficient in utilization of the credit advanced. Nevertheless, they augment their business with other livelihood activities as an avenue to enhance their livelihood.

However, the case of gender stereotype and discrimination inhibited active participation of women in milling enterprise. Besides, economies of scale due to small-scale operational level are found to be a potential threat to economies of size of the rice value chain in the long-run. Epileptic power supply is hampering the economic performance of the value chain especially the millers, as cost of fossil fuel has a toiled effect on the financial performance of the milling enterprise.

Therefore, in order to increase the well-being of the processors and prospects of the enterprise, there is need to close these gaps:

There is need for gender mainstreaming and gender budgeting to address the challenge of gender stereotype and discrimination in the study area. Also, cheaper and eco-friendly energy technologies should be introduced to the processors.

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Determinants of income disparity among oil palm processors in Southwest Nigeria: Gender perspective

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Abstract: The study focused on the gender perspective of determinants of income disparity among oil palm processors in the study area. The primary data were collected with the aid of a structured questionnaire. A multistage sampling technique was used to select 320 (160 males and 160 females) oil palm processors. Data collected were analysed using descriptive statistics, Ordinary Least Square Regression, Gini-Coefficient and the Regression-Based Inequality Decomposition Index. The result showed that the income disparity within the male processors is 0.72% while within the female processors is 0.67. There was more income disparity among male processors than their female counterparts. The OLS result showed that age, education, extension services, years of experience, access to credit and adoption of technology significantly influence the income of female respondents while age, extension services and years of experience significantly influence income of male respondents. The result of socio-economics factors that contribute to income inequality revealed that education and family size will reduce income inequality among the female while adoption of technology will reduce inequality among the male respondents. Age, extension services, marital status, experience, access to credit, technology adoption and land acquisition will increase inequality among the female respondents while age, extension services, marital status, experience, access to credit, education family size and land acquisition will increase income inequality among the male respondents. Policy makers should formulate policies that will ensure reduction in the level of income inequality among male oil palm processors in order to improve the welfare status of the oil palm processors.
Keywords: Income, disparity, gender, processors, oil palm

INTRODUCTION

Agriculture has been a veritable tool for sustainable growth and development. It occupies the central place in the economy of Nigeria, providing the main livelihood source for most Nigerians. Agriculture provides 80 percent of the total food with 33 percent of the country's land under cultivation (Adepoju and Obayelu, 2013; Megan, 2022). The final goal of agricultural plans and production in national development is to enhance and increase the citizens' standard of living in relation to average income distribution and income equality (Addison and Cornia, 2001).

Oil palm processing, irrespective of the level (large or small scale) is a major source of income and employment for a large proportion of the poor rural population in Nigeria, (Olagunju, 2008). Oil palm *processing* is a fundamental and significant strategy for agricultural and industry-led growth for poverty reduction because of its potential to provide income for many rural households (Osei-Amponsah *et al.,* 2012). This contributes to Nigeria's GDP and agricultural sector and enhances economic growth. However, growth may not be enough without giving attention to income disparity and eliminating barriers that prevent the poor to benefit from a growing economy and to contribute to that growth (Iwayemi *et al*, 2000). Saira and Ather (2016) opined that during high periods of growth, the emergence of high levels of income inequality decreased the growth momentum and reduced the poverty-decreasing effect of the growth.

On the other hand, periods of low growth were marked by undue increase in poverty due to income inequality. According to Winkelmann and Winkelmann (2010), income inequality harms both individual and farmers' welfare. One of the main problems confronting countries' development and sustainable growth is income inequality **(**Korawit, 2012).

Furthermore, income inequality does not bring growth but is associated with economic instability. Despite the enormous potential associated with oil palm processing, income disparity has been the main obstacle affecting the productivity and welfare of oil palm processors in Nigeria, a source of concern. In addition, in the world today, regardless of socioeconomic class and status, there are systematic gender differences in material, well-being and income inequality (Etim *et al.,* 2020). Thus, this study is designed to fill this information gap by examining gender perspective of determinants of income disparity among oil palm processors in Southwest, Nigeria**.** Specifically, the study measures income disparity between the male and female, examines the factors influencing the income and identifies some socio-economic determinants of income disparity between the male and female oil palm processors.

METHODOLOGY

This study was carried out in Southwestern Zone of Nigeria, which lies between latitude 6^{o} to the North and 4^{o} to the South. It is marked by longitude 4^{o} to the West and 6^{0} to the East. It covers a land area of about 114,271 square kilometres, representing 12% of the country's land mass. The total population is about 27,581,992 and more than 96% of the population is Yoruba (NPC, 2006). The Zone comprises six (6) States: Oyo, Osun, Ogun, Ondo,

Ekiti and Lagos. It is bounded in the North by Kogi and Kwara states, in the East by Edo and Delta states, in the South by the Atlantic Ocean and in the West by the Republic of Benin. The climate is tropical and characterized by bi-modal rainfall pattern. The raining season, commonly called the cropping season, starts in late March and ends in October every year. The mean annual rainfall ranges from 800 mm in the derived savannah zone to 1500mm in the rainforest zone, while the mean annual temperature varies from 21.1°C to 31.1°C. The vegetation is mostly rainforest. Agriculture is the main occupation of the people and the notable food crops cultivated annually include cassava, maize, cowpea, rice, sorghum, millet, yam, and banana, while the cash crops are cocoa, oil palm, rubber, coffee, Kolanut among others.

Primary data was used for this study. The primary data was collected using well-structured questionnaire to obtain information from the oil palm processors. The study adopts a multi-stage sampling procedure. The first stage involved a purposive selection of Ondo and Ekiti States out of the six States in Southwest based on the predominance of oil palm processing enterprises. The second stage involved purposive selection of four (4) Local Government Areas (LGAs) based on concentration of oil palm processing enterprise in the selected LGAs. The Local Government Areas were, Okitipupa, Irele, Akure North and Ifedore of Ondo State, while were Gbonyi, Ise, Emure and Ikere were selected from Ekiti State. The third stage involved purposive selection of four (4) oil palm dominated processing communities from each LGA. The fourth stage involved stratified selection of 10 respondents (5 males and 5 females) from each community to capture both genders adequately. This gives a total sample size of 320 oil palm processors but only 275 was valid for the data analysis. The analytical techniques that were employed include:

(i) Gini Co-efficient and Lorenz Curve

The Gini Co-efficient and Lorenz curve was used to ascertain the level of income inequality between the male and female respondents in the study area (Objective 1). The Gini coefficient was used to measure income inequality. The coefficient can take any values between 0 to 1 (or 0 % to 100 %). A low Gini-coefficient indicates more equal income or wealth distribution, while a high Gini-coefficient indicates more unequal distribution of income. Zero (0) corresponds to perfect equality while one (1) corresponds to perfect inequality. The Gini coefficient is a numerical representation of degree of inequality in the distribution that is derived directly from Lorenz curve. The Gini Co-efficient model is given by:

$G = 1 - \Sigma XY$ …… (1)

Where:

G = value of the Gini coefficient

X = percentage of oil palm processor

Y = cumulative percentage of income from oil palm processing

(ii) Ordinary Least Square (OLS) Regression Model

Ordinary Least Square (OLS) Regression was used to determine factors influencing respondents' income. The model is specified as follow;

$Y_i = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 + \beta_9 X_9 + \varepsilon_i$……. (2)

Where

Y = Total income of the respondents (₦)

X_1 = Age of respondents (years)

X_2 = Education level (years spent in school)

X_3 = Access to Extension Service (Yes or No)

X_4 = Marital status (married, single, divorced)

X_5 = Processing Experience (years)

X_6 = Access to credit (Yes or No)

X_7 = Adoption decision (adopted =1 and 0, otherwise)

X_8 = Family size (numbers)

X_9= Land acquisition (Rent, Gift, Inheritance, Purchase)

ε_i= error term.

(iii) Regression Based Inequality Decomposition Index

The coefficients obtained from OLS regression was used to find the percentage contribution of the socioeconomic variables to the level of disparity using the Regression Based Inequality Decomposition Index (Objective III) as specified below

$S_j = Cov(\beta_j X_j, lnY)/\sigma^2(lnY) = \beta_j * \sigma(X_j) * cor(X_j, lnY)/\sigma(lnY)$ ……(3)

Where

β_j represents the estimated coefficient from the OLS regression of the *jth* characteristic of an individual, and X_j represents the value taken on by the *jth* characteristic, $\sigma(X_j)$ and $\sigma(lnY)$ are the standard deviation of X_j and of lnY, respectively and $cor(X_j, lnY)$ is the correlation between factor j and lnY. The positive S_j implies that j is an inequality-increasing factor whereas the negative S_j means that factor j decreases the inequality. From equation 3, the coefficient of the respondents' characteristics in relation to their income covaries. Similarly, the standard deviation of each of the respondent's income in relation to the respondent's characteristics is also, not the same. It can therefore be deduced when relating the inequality as dependent variable $S_j(lnY)$ which implies that the share of *jth* characteristic in inequality (Gini index), is because X_j is unequally distributed among the households.

RESULTS AND DISCUSSION

Estimation of income inequality using Gini Coefficient

The result of income inequality is presented in Table 1. The study ascertained the presence of income inequality among the processors in the study area. Table 1 presented the proportions of respondents (X) and income accrued (PHI) in each interval of income. The disparity in income earned by the female and male respondents revealed that more (30%) of the female respondents earned less than ₦100,000 per annum which formed nearly 7% of the total income share. About 26% of the male respondents earned between ₦100,001 and ₦200,000 per annum and this accounted for about 8% of the total income share. In the same vein, nearly 80% of the female processors earned at most ₦500,000 per annum with just 53% of the total income share, and just 20% of them earned about 47% of the total income share. In the case of male counterpart, nearly 72% of the processors earned at most ₦500,000 per annum which formed just 31% of the total income share. Few (28%) of them earned at least ₦500,000 per annum which accounted for nearly 68% of the total income share. Generally, the male farmers earned more income and therefore, richer than their female counterparts (NNF, 2007).

It was observed that few of female (20%) and male (28%) with a benchmark of ₦500,000 per annum, earned larger percentage of the total income shares of 47% and 68%. It was also noted that only 2% of the female earned 1 million naira and above and they formed about 9% of the total income share, while nearly 8% of the male processors earned at least 1 million naira per annum which accounted for about 39% of the total income share in the study area. This observation contradicts the earlier report that female processors earned more than their male processors in Ondo State (Koledoye and Deji, 2015). However, the change could be attributed to male processors getting more involved and taking oil palm as their main source of income as well as main business.

Therefore, Gini coefficient results for gender differentials on income disparity showed that there was more income inequality among male respondents (0.72) than the female counterpart (0.67) in the study area. This implied that the disparity between the highest and lowest income earners was about 72% and 67%, respectively for male and female respondents. This could be because of 2% and 8% of female and male respondents who contributed 9% and 39% respectively to the total income share in the study area. Despite the presence of income inequality, income disparity within the male group is higher than that of their female counterpart. The probable reason might be because of the few processors that earned over one million Naira who were more than the female, and it is believed that men have access to loan, assets, and technologies than the female. This result agrees with the Gini-coefficient of 0.64 and 0.58 reported for both male and female, respectively (Etim *et al*, 2020).

Based on the Lorenz's curves (Figs 1 & 2), it was observed that the curves deviated from the diagonal lines for female and male respondents which confirmed the presence of inequality among the processors in terms of income accrued from the enterprise. This depicts that male respondents contribute more to income inequality in the study area than their female counterparts. This concords with the findings of Awotide *et al*. (2015) and Etim *et al.* (2020).

Table 1: Distribution of respondents by Gini Coefficients Estimates

Income (₦)	Female			Male		
	X	PHI	XY	X	PHI	XY
> 100,000	0.30	0.07	0.02	0.14	0.02	0.00
100,001 – 200,000	0.16	0.07	0.02	0.26	0.08	0.02
200,001 – 300,000	0.23	0.19	0.08	0.20	0.10	0.04
300,001– 400,000	0.03	0.04	0.01	0.01	0.01	0.00
400,001 - 500,000	0.10	0.15	0.05	0.11	0.10	0.03
500,001 - 600,000	0.10	0.19	0.07	0.08	0.09	0.03
600,001 – 700,000	0.01	0.01	0.00	0.01	0.01	0.00
700,001 – 800,000	0.05	0.13	0.04	0.04	0.06	0.02
800,001 - 900,000	0.02	0.05	0.02	0.04	0.07	0.02
900,001 – 1,000,000	0.00	0.00	0.00	0.03	0.06	0.02
> 1,000,000	0.02	0.09	0.02	0.08	0.39	0.08
Lorenz's coefficient (∑XY)			0.33			0.28
Gini coefficient (1-∑XY)			0.67			0.72

Note: X = Proportion of respondents; Y = Cumulative proportion of respondents Income
PHI = Proportion of respondent Income.

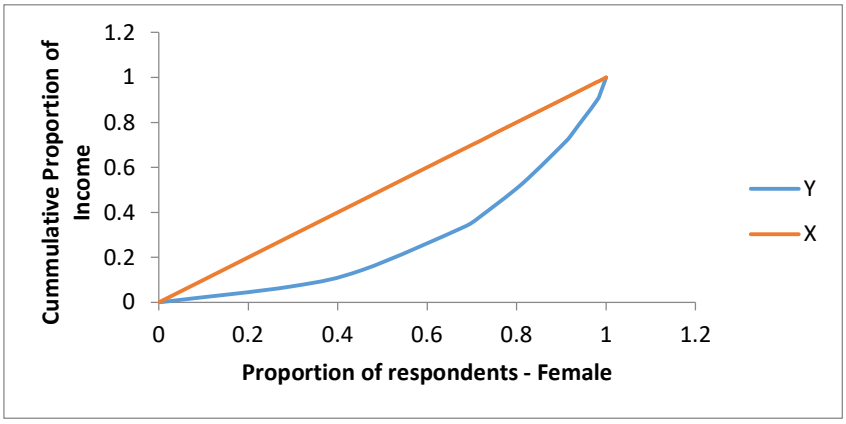

Figure 1: Lorenz's Curve for the Distribution of Female Income

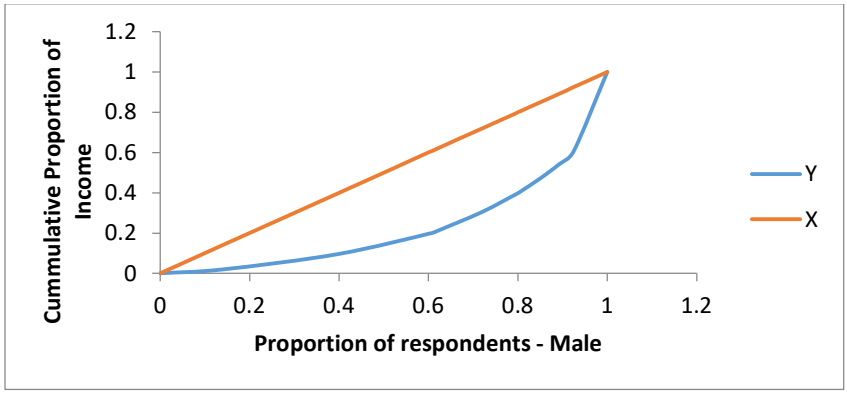

Figure 2: Lorenz's Curve for the Distribution of Male Income

Determinants of annual income earnings among respondents

The Ordinary Least Square (OLS) regression model result on the determinants of annual income of respondents is presented in the Table 2. The natural log of annual income was used as the dependent variable in the Table. The gender differentials result showed that, the R^2 estimate of female respondents was (0.61) and it was higher than that of male counterpart which was 0.44. This implied that the explanatory variables explained 61% and 44% of the variations in the annual income earnings of the female and male processors respectively. The F-values of 12.20 and 2.27 were statistically significant at 1% and 5% levels for female and male genders respectively, meaning that all the explanatory variables jointly exerted influence on the dependent variable.

Table 2 revealed that for the female respondents, six out of nine independent variables included in the model were statistically significant in addressing the income earnings, while marital status was omitted from the model because of collinearity problem. All the variables also had positive association with the annual income earnings except age of the female processors, family size, and land acquisition methods. Again, only two variables were statistically significant out of nine variables included in the model for male respondents. It was also observed that all the predictors were positively associated with annual income earnings except age of the male respondents and adoption of technology. Examining the results explicitly and based on the gender differentials, the following observations were reported.

Age: The coefficient of age of the processors was negative and significant at 1% level in addressing income earnings from oil palm processing. It showed that as the processor is getting older, the income earning will be reduced by 2.1%. The results observed between female and male respondents revealed that an advancement in the age of female and male respondents will result into 2.1% decrease in the income earned from the oil palm processing. This showed that age of the respondents had equal effect on their income and one can deduce that old processors will not be active and economically productive compared to the young processors.

Educational status: The coefficient of educational status of the female respondent was highly significant at 1% level and positively associated with the income earned, hence, education will contribute to the income of the female, while it was not statistically significant in the case of male respondent but, positively related with the income

earned. This indicated that more educated female processors earned about 4.6% income than the uneducated processors. This revealed that education enable processors to acquire knowledge and skills that could increase their incomes, thus bridging the inequality among the processors.

Access to extension services: The coefficient of access to extension services was positive and statistically significant at 10% level for both female and male respondents but the contribution of access to extension services (5%) to income earnings of male respondents is greater than that of female respondents (4.7%). The probable reason could be that male respondents might be given more attention than female respondents, which has led to an increase in the income earnings of male respondents.

Processing experience: The coefficient of the year of processing experience was positive and highly significant at 1% level in addressing the income earnings of the processors. The result revealed that a year increase in the processing experience will result in 2.5% and 4.3% increase in the income earned by female and male respondents, respectively. It showed that experienced male respondents would make more income than the experienced female respondents by 1.8%. The probable reason might be because of early involvement of male respondents in processing activities compared to the female.

Access to credit: The coefficient of access to credit by female respondents was positive and significant at 1% level, while the coefficient of access to credit by male was positive but did not significantly affect income earned. It can be interpreted that access to credit by female respondents will lead to increase in income earnings by 67.6%. The probable reason might be that when females obtain loans/credit, they always devote the money to the purpose, unlike their male counterparts who could divert loans to other activities such as marrying another wife or buying of cars.

Adoption of technology: It was observed that only female respondents' model had a positive coefficient and was statistically significant at 5% level. This implied that the adoption of technology would result to 35.2% increase in the income earnings of the female respondents. One can deduce that a high receptiveness to the adoption of technology by women could result in the female respondents' positive contribution to income earnings. Again, the study's coefficient of male respondents was negative and not statistically significant. This is contrary to the *apriori* expectation that the adoption of technology will lead to a decrease in the income earnings of the male respondents.

Table 2: Results of OLS in Estimating the Determinants of Processors Income

Variable	Female		Male	
	Coefficient	P-value	Coefficient	P-value
(Constant)	10.675	0.000	11.572	0.000
Age	-0.021***	0.000	-0.021***	0.007
Education	0.046***	0.004	0.032	0.296
Extension	0.047*	0.061	0.050*	0.084
Marital status	-	-	0.005	0.988
Experience	0.025***	0.001	0.043***	0.001
Credit	0.676***	0.000	0.273	0.228
Adoption	0.352**	0.056	-0.140	0.679
Family size	-0.006	0.964	0.195	0.324
Land acquisition	-0.013	0.780	0.003	0.949
R^2	0.610		0.444	
F-value	12.204***		2.269**	

Significant at***1%, **5%, *10%

Estimation of factor inequality weight

The regression-based decomposition approach proposed by Fields (2003) and employed by Saira and Ather (2016) enables this study to measure the inequality in annual income explained by the socio-economic characteristics of the processors. This was carried out by estimating the factor inequality weight, S_j, attributed to each of the j^{th} individual characteristics using the coefficient estimates from the regression output in Table 3. It should be noted that the positive value of the S_j means that the variable is increasing inequality whereas the negative value means that the variable is decreasing inequality. Therefore, the table presents the factor inequality weight of each variable, and the variables in independent model can explain 61% and 44% of the inequality in the annual income for the female and male respondents, respectively. All the variables have positive S_j except marital status and family size. All the S_j in female model were positive except variables such as education and family size. In the same vein, for the male all the S_j were positive except adoption of technology. This is in accordance with Nuno *et al.* (2012), which shows that inequality increases with

active age, number of unemployed individuals, educational level and main source of income.

Age of the processors: The result showed that age of male respondents increases the inequality by 9.8%, while it was unchanged in the case of the female. The probable reason might be because the male are more risk takers, active and economically productive, and have access to loan than the female, and this could amount to high income among the male.

Educational status of the Processors: Educational status will increase inequality and will help to generate more income opportunity among the male processors than the uneducated individual. The male respondents had a positive inequality weight of 0.4 which indicated that level of education increases inequality by 0.4%. While the factor weight inequality was negative in case of the female respondents, meaning that educational status is an inequality decreasing variable.

Access to Extension services: The coefficient of factor weight inequality was positive meaning that access to extension services is inequality increasing variable. The coefficient of factor weight inequality was positive for the male and female respondents. The gender differentials showed that access to extension services by female increases inequality by 2.2%, while access to extension services by male increases inequality by 1.5%. This is an indication that empowering female processors through extension agents might yield more results in term of high income than the male.

Marital status: It showed that marital status decreases the inequality. It showed that the being a married male increases inequality and its effect is also small. This could be due to the fact that young, agile and single processors could generate higher income than the married processors, and this might be because of the responsibilities attached to married processors that could restrict the ability to generate more income.

Years of processing experience: The coefficient of years of processing experience was positive for the male respondents and this increases inequality. The female's coefficient of years of processing experience was zero, indicating that year of experience neither increases nor decreases the inequality among the female respondents, while the male's years of processing experience increases inequality by 13.5%. It showed that the more experienced male respondents are, the more there will be income inequality among them.

Access to Credit: Access to credit increases the inequality among the processors. The gender differentials reflected that access to credit by female increases inequality by 1.1% while access to credit by male increases inequality by 0.2% and also it probably enables them to invest more in the processing enterprise which could result in adoption of technology and increase in the intensity of technology adoption compared to those that do not have access to credit.

Adoption decision on Technology: The result revealed that female respondents' adoption decision on technology increases inequality by 0.4%. This implied that adoption decision will enable them to employ technologies that would help them to generate more income and opportunities for increased output and thereby resulting in inequality while male respondent's adoption decision on technology decreases inequality by 0.002%.

Family Size: The coefficient of family size was negative, and this indicated that the variable decreases inequality by 0.004% with female, in the case of male processors, family size increases inequality by 0.4%.

Land Acquisition Methods: Land acquisition methods by the female and male respondents increase inequality by 0.02% and 0.002% respectively. Hence, processors that owned the land used for processing, through purchase or inherited, would likely increase inequality as a result of land tenure security compared to insecure landowners.

Table 3: Distribution by Factor Inequality Weight

Variable	Female		Male	
	Coefficient	Sj	Coefficient	Sj
Age	-0.021	0.00	-0.021	0.098
Education	0.046	-0.031	0.032	0.004
Extension	0.047	0.022	0.050	0.015
Marital Status	-	-	0.005	2.62E-07
Experience	0.025	0.00	0.043	0.135
Credit	0.676	0.011	0.273	0.002
Adoption	0.352	0.004	-0.140	-1.8E-05
Family size	-0.006	-3.8E-05	0.195	0.004
Land acquisition	-0.013	0.0002	0.003	1.51E-05

CONCLUSION

The study revealed that there was income disparity within the male processors and the female processors. However, there was more income disparity within male processors than their female counterpart. Also, the factors that contribute to

income inequality revealed that education and family size will reduce income inequality among the female while adoption of technology will reduce inequality among the male respondents. Age, extension services, marital status, experience, access to credit, technology adoption and land acquisition will increase inequality among the female respondents while age, extension services, marital status, experience, access to credit, education family size and land acquisition will increase income inequality among the male respondents.

In view of the findings of this study, it is recommended that the government should provide adequate and effective extension services in order to improve processors' livelihood. Also, adoption of technology reduces income inequality among the male. Therefore, processors should be encouraged and sensitized to adopt processing technology. Educating the female folks is an important tool in reducing income disparity, hence the female should be given proper and higher-level education. Having revealed that there was high income disparity within the male and the female oil palm processors, policy makers should formulate policies that will ensure reduction in the level of income inequality among the oil palm processors most especially the male. This will improve the welfare status of the oil palm processors in Nigeria.

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Training Needs of Internship Students of the Faculty of Agricultural Sciences, Ladoke Akintola University of Technology, Ogbomoso, Nigeria

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Abstract: Qualitative education involves acquiring skill and knowledge, and its application in solving possible identifiable tasks is the motive behind the internship scheme as embedded in the Nigeria University Curriculum of Agriculture. Interns gain work experience not only to satisfy requirements for their different qualifications but also an avenue to acquire skills and potential against future challenges, especially in this era of unemployment. The study therefore, assessed the training needs of internship students of the Faculty of Agricultural Sciences, Ladoke Akintola University of Technology, Ogbomoso, Nigeria. A multistage sampling technique was used to select ninety-three (93) students. Different training units were identified, and areas of training needs were indicated. There were significant relationships between some selected socio–economic variables (age (r=0.248*, P≤0.017); sex (r=0.289**, P≤0.005); marital status (r=0.030, P≤0.775); religion (r=0.313**, P≤0.002); department of the student (r=0.207*, P≤0.407)) and level of needs of identified training areas. The study suggests improving the internship programme across all training units. The authority should introduce more training units to motivate students' participation and guarantee practical skills and knowledge acquisition.
Keywords: Training needs, Internship students, SIWES

INTRODUCTION

Universities worldwide are mandated to produce the skilled human resources necessary to function effectively in their societies. As a result, their training programmes are tailored towards achieving this mandate. The ability to accomplish this mandate distinguishes one University from the other. It is on these bases that Universities are ranked. Students who meet the mandate successfully and effectively are ranked higher than those who cannot do so effectively (Student Personal Development (SPD) Hub, 2020). University students acquire different skills through training, especially during internships. Training is vital to human capital development and overall industrial advancement; it is further essential in the industrial revolution and the growth of industries. The training is instrumental to a practical, intelligent, competent and reliable employee. It allows for the correctness and meticulous job role performance (Ogbuanya *et al*., 2018; Bag *et al*., 2021). The lack of practical use of theories learned in the classroom by graduates was identified by employers of labour as the primary cause of graduates' abysmal performance when employed. Establishing 'the Students' Industrial Work Experience Scheme (SIWES) enabled students to connect the academic world with real industrial situations before graduating from various learning institutions. The scheme was established to allow students to handle equipment and machinery, gather experience and familiarize themselves with situations the school environment cannot afford (Rita, 2017; Molino *et al*., 2020). This study focused on only the students in the Faculty of Agricultural Sciences of Ladoke Akintola University of Technology (LAUTECH), Ogbomoso, Nigeria. These undergraduate students acquired diverse Agricultural skills during the Internship which usually lasted for an Academic Session to corroborate the theories learned in different classes.

Concept of skill acquisition

Skill acquisition may be viewed as making superlative output a general characteristic of one's behaviour in a given field. It gradually changes from less effective behaviour to an extremely proficient one. A skilled worker is adept in the trade or has attained excellence in a particular trade or undertaking. Skill acquisition, therefore, involves painstaking effort, discipline, practice and drill, and reviews. In other words, skill is the ability to do something well, usually gained through training or experience. Skill acquisition, conversely, involves developing a new skill, practice or way of doing things, usually gained through training or experience. Skill Acquisition is the science that underpins movement learning and execution and is more commonly termed motor learning and control. It is common knowledge that about 80% of graduates in most Nigerian Universities find it hard to get employment yearly (SPD-Hub, 2020). This is mainly due to the curricula of the Universities and other tertiary schools that emphasize training for white-collar jobs.

Nigeria, like other developing countries, is faced with several problems ranging from youth and graduate unemployment, high levels of poverty, insurgency, conflict and diseases, insincerity, over-dependency on foreign-made goods, low economic growth and development, lack of capacity and required skills to move the economy forward and

urbanization. Unemployment has become a major problem bedevilling the lives of youths and graduates, causing frustration, depression, sadness and dependency on family members and friends. The high level of unemployment among this population in Nigeria has contributed to the high rate of insecurity, violence in elections and poverty (SPD-Hub, 2020). On this premise, this research work was pursued to determine the training needs of internship students of the Faculty of Agricultural sciences, LAUTECH, Ogbomoso, Nigeria. Specifically, the study described the socio-economic characteristics of the students; examined the existing training units / students' participation in the LAUTECH Teaching and Research Farm; investigated areas of training needs and the level of need. The study further tested for relationships between the measured variables.

METHODOLOGY

The study was carried out in the Teaching and Research Farm of the Faculty of Agricultural Sciences, Ladoke Akintola University of Technology Ogbomoso, Oyo State. The programme's fourth year is called the internship year based on the Faculty Curricula. A multistage sampling technique was employed to select respondents for this study. First stage involved the selection of five percent (5%) from the total number of registered one thousand, eight hundred and fifty-five students (1,850) across the six Departments in the faculty, while the second stage involved the selection of ninety-three (93) students through simple random sampling technique which represented the sample size of the study. A validated questionnaire was used to elicit information from the sampled students. Descriptive statistics (frequency counts, percentages, mean and ranking) and Pearson Product Moment Correlation were statistical tools used to analyse the study's data.

RESULTS AND DISCUSSION

Socioeconomic characteristics of the respondents

This section explained the socio-economic characteristics of the sampled students. Table 1 revealed that 58.1% of the respondents were between 20 and 25, while 41.9% were above 25. The mean age was 25.03 years. This result indicates that the faculty students are young and expected to be productive during their internship programme. It is also likely that the sampled students will exploit the opportunity of being youths and derive possible pleasure from having acquired what they are supposed to know at every training unit during the internship period. More than half (61.3%) of the respondents were female, while only 38.7% were male. This implies that internship programme is designed for both genders.

The result further revealed that most respondents (86.0%) were single, and 14.0% were married. This implies that the population of the single students is more than that of married students. This may be true because University programme is not an adult literacy class. On religion, more than half (58.1%) of the respondents were Christian, while 41.9% were Muslim. This result implies that Christians and Muslims constituted the student population in the faculty. The religious affiliation of these students may influence their zeal and readiness to learn from different training units available in the Faculty's Teaching and Research Farm.

Table1: Distribution of respondents by socioeconomic characteristics N=93

Socioeconomic characteristics	Frequency	Percentage	Mean
Age (years)			
20-25	54	58.1	25.03
25 and above	39	41.9	
Sex			
Male	36	38.7	
Female	57	61.3	
Marital Status			
Married	13	14.0	
Unmarried	80	86.0	
Religion			
Christian	54	58.1	
Muslims	39	41.9	
Department			
AER	24	25.8	
AEC	2	2.2	
ANB	10	10.8	
APH	32	34.4	
CPS	9	9.7	
CEP	16	17.2	

Source: Field survey, 2022.

Furthermore, the study discovered that, only 17.2% of the sampled students were from the Department of Crop Protection and Environmental Sciences (CEP), whereas 25.8% came from the Department of Agricultural Extension and Rural Development (AER), 2.2%, 10.8%, 34.4%, and 9.7% of the students were from the Department of Agricultural Economics (AEC), Animal Nutrition and Biotechnology (ANB), Animal Production and Health Sciences (APH), and Crop Production and Soil Sciences (CPS), respectively. This result implies that the sampled internship students were from different departments that constituted the Faculty of Agricultural Sciences at the University. They received related practical training in each field, making them employable and eventually self-employed or an entrepreneur after graduation. This is in line with the submission of Adeosun *et al*. (2021), who opined that internships or immersion programs are work-based educational experiences related to specific jobs, positions, occupations or professions. They are career-oriented curricula endeavours of practical application (Mhaka, 2020).

Existing training units and students' participation

Table 2 revealed the multiple responses of students with respect to different training units and students' participation during internship programme and all the responding students indicated Cattle, Sheep and Goat, Farm mechanization, Feed mill, Crop type collection, Arable, Garri processing, Piggery, Rabbitry (Cane rat/Rabbit) and Permanent unit (permanent crops such as cashew, mango) as the available training units where they participated. Also 98.9%, 97.8%, 95.7% and 87.1% of the students indicated poultry, Apiary, Fishery and Snailery. The variation in the responses may be due to some students' absenteeism during the internship orientation programme where students were introduced to the various units on the farm. This result implies that, the internship students in the Faculty participated and were exposed to different practical trainings that are virtually excluded in the classroom lectures which give them opportunities to acquire requisite skills, knowledge and the management of the various units for profit which they may need in the industry. This conforms with Elarde & Chong (2012) who opined that internships provide students with practical experience, which cannot be fully simulated in the classroom. Consequently, interns are better prepared to cope with the challenges of the work environment and their job performance may be accelerated (Maertz *et al*., 2014)

Table2: Distribution of respondents by existing training units during Internship

Training units	*Frequency	Percentage
Fishery	87	95.7
Cattle sheep and goat	93	100.0
Apiary	91	97.8
Farm mechanization	93	100.0
Feed mill	93	100.0
Poultry	92	98.9
Crop type collection	93	100.0
Arable	93	100.0
Garri processing	93	100.0
Piggery	93	100.0
Snailery	81	87.1
Rabbitary (cane rat/rabbit)	93	100.0
Permanent	93	100.0

Source: Filed survey, 2022; *: Multiple responses.

Areas of training needs and level of need

The students rated the various areas of training identified on a three-point rating scale of high, moderate and low, while the mean was computed and ranked accordingly. The result was presented in Table 3. Data presented showed that Animal vaccination has the highest weighted mean score (WMS) of 2.7 and was ranked first (1st). This was followed by fishery, i.e. (especially practical hatchery) and animal pregnant delivery, each with WMS of 2.6 (2nd), respectively. Furthermore, mechanization, which includes tractor driving and coupling of implements, apiary management from the establishment to honey harvesting, piggery routine management and castration, cattle milking and seedlings raising/nursery, all with WMS of 2.5 and they were ranked fourth (4th) respectively based on the areas of training needs and their levels of need as indicated by the sampled students. Global Positioning System (GPS) was ranked ninth (9th) with a WMS of 2.1. These results revealed the training needs and levels of need among the internship students. The variation in their level of need may be due to differences in their interest towards each of the identified training units, different disciplines/departments and the attitude of the trainers during the Internship, as some students may develop interest during the training process if there is encouragement on the part of the trainers therefore, if the students develop a negative attitude

toward a specific training unit that may hinder the acquisition of expected skills and knowledge from such unit, which contradicts the objective of Internship Scheme. Bukaliya (2012) also confirmed that students acquire the necessary skills and expertise during the Internship.

Table3: Distribution of respondents by areas of training needs and level of need

Areas of training needs	Frequency (percentage)				
	Level of need				
	High	Moderate	Low	WMS	Rank
Mechanization (tractor driving and coupling)	57(61.3)	28(30.1)	8(8.6)	2.5	4th
Apiary (establishment to harvesting)	52(55.9)	39(41.9)	2(2.2)	2.5	4th
Fishery (hatching)	69(74.2)	14(15.1)	10(10.8)	2.6	2nd
Piggery (routine management and castration)	51(54.8)	33(35.5)	9(9.7)	2.5	4th
Animal vaccination	66(71.0)	21(22.6)	6(6.5)	2.7	1st
Use of GPS	28(30.1)	47(50.5)	18(19.4)	2.1	9th
Animal pregnant delivery	64(68.8)	23(24.7)	6(6.5)	2.6	2nd
Cattle milking	60(64.5)	21(22.6)	12(12.9)	2.5	4th
Seedling raising/nursery	47(50.5)	42(45.2)	4(4.3)	2.5	4th

Source: Field Survey, 2022
Figures in parentheses are percentages
WMS: Weighted Mean Score
GPS: Global Positioning System

Test of hypothesis

Pearson Product Moment Correlation (PPMC) was used to determine a significant relationship between the independent and dependent variables. The results in Table 4 revealed that some of the selected socio – economic characteristics of the Internship students such as age (r=0.248*, p≤0.017); sex (r=0.289**, p≤0.005); marital status (r=0.030, p≤0.775); religion (r=0.313**, p≤0.002); department (r=0.207*, p≤0.407) exhibited a significant relationship with the level of needs of identified training areas. The result implies that all the aforementioned socio-economic variables (age, sex, marital status, religion, and department) influence the level of need for the identified training areas among the students. The relationship between the students' level of need for different identified internship training units and their socio-economic characteristics may also be attributed to students' attitudinal differences and interest towards various disciplines of agriculture in the Faculty.

Table4: Test of significant relationship between the selected socio-economic characteristics and level of training needs among Internship students using Pearson product Moment Correlation (PPMC) analysis.

Socioeconomic Variables	Correlation Coefficients	P-value	Decision	Remark
Age	0.248*	0.017	S	Reject H_o
Sex	0.289**	0.005	S	Reject H_o
Marital status	0.030	0.775	NS	Accept H_o
Religion	0.313**	0.002	S	Reject H_o
Department	0.207*	0.047	S	Reject H_o

Source: Data Analysis, 2022
**Correlation is significant at the 0.01 level (2-tailed)
*Correlation is significant at the 0.05 level (2-tailed)

CONCLUSION AND RECOMMENDATIONS

This study revealed several Teaching and Research Farm units under the Faculty of Agricultural Sciences, LAUTECH. Despite the exposure of sampled students to different training units, almost all the students indicated other areas of agricultural training units where they required skills and knowledge (such as mechanization and GPS), where they were exposed to during the internship programme. The study, therefore, recommends improving internship training to enhance practical skills and knowledge acquisition. As a result of the training opportunities in Agricultural programmes, admission seekers should be encouraged to pursue those programmes as it offers opportunities for self-employment especially in this era of unemployment challenge.

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Economic analysis of Kolanut in some selected markets in Southwestern Nigeria

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Abstract: There are several studies on kolanut marketing, but there is a dearth of information on its effectiveness. Thus, this study determined the efficiency of kolanut marketing in Nigeria. Two major kolanut markets were purposively selected: Gbongan in Osun and Shagamu in Ogun. A simple random sampling technique was used to select 106 kolanut marketers in Gbongan, and 96 marketers in Shagamu and information were obtained from the marketers using a well-structured questionnaire. Data were analysed using descriptive statistics, marketing efficiency and linear regression analysis. The mean age of the marketers in Gbongan was 53 years they had secondary education (46.1%), and they had a mean of 26 years of experience in kola marketing. The mean age of kolanut farmers in Shagamu was 52 years old, with primary education (41.7%) and Eighty-eight percent of the marketers need paper for processing, 64% of them were using leaves while 56% and 88% used Gamallin and Phostocin chemicals respectively. In Shagamu the average TC/kg was ₦1442, Average Total Revenue/kg was ₦19803, the profit/marketer/kg was ₦18,361 and the efficiency was 12.73 while in Gbongan the average TC/kg was ₦1833, Average Total Revenue/kg was ₦12478, profit/marketer/kg was ₦10,645 and the efficiency was 5.80. The determinants of marketing efficiency in the markets were age, marital status, educational level, type of kolanut and the price of kolanut per kg. Marketers in Shagamu are more efficient than marketers in Gbongan. Kolanut marketing in Shagamu should be properly developed to enhance higher efficiency.
Keywords: Gbongan, Kolanut, Markets, Marketers, Shagamu.

INTRODUCTION

Kolanut, an important tree crop, is regarded as one of the cash crops that serve as significant revenue source for some West African countries, including Nigeria. However according to Ugwu *et al.,* 2020 and Oluyole *et al*., 2009 Nigeria produces almost 70% of the total quantity of kolanut produced worldwide and it is on record that close to 90 percent of Kolanut produced annually by kola farmers in Nigeria are eaten or utilized locally while about 10 percent is sold to foreign countries (Ndagi *et al.,* 2020 and Oluyole *et al*., 2009 Nigeria produces almost 70% of the total quantity of Kolanut produced worldwide and it is on record that close to 90 percent of Kolanut produced annually by kola farmers in Nigeria are eaten or utilised locally while about 10 percent is sold to foreign countries (Ndagi *et al.,* 2012). Some other African countries where Kolanuts are produced in abundance are Ghana and Cote De'voire, where they spread to other areas where their cultivations were brought about by humans (Chinweike *et al.,* 2020). Kolanut cultivation is also known to take place in countries such as Jamaica, Indonesia, and South America (Asogwa, 2011).

Kolanut, a stimulant tree crop belongs to the family known as *sterculiaceae*. A typical kola tree is a woody evergreen plant which could attain heights between 10-20 meters. The stem is straight with large leaves that are tough and dark or green in colouration. It produces pods that are usually borne in clusters, each containing 4-40 seeds or nuts, depending on the variety. Each seed is enclosed in a soft white, thick seed coat known as the testa. Every seed referred to as Kolanut comprises of two very large fleshy cotyledons joined together through a tiny plantlet (Opeke, 1992). Kolanut seeds or embryo may come in three colours: white, pink or red: while any pod may have any combination of the three colours (Kim and Frey, 2005). Though kola trees require a hot humid climate for survival and are able to withstand three months of dry season, they are very resilient and could survive in a drier area where ground water is available. Concerning suitable climatic condition for kola, Kolanut trees grow under the same climatic conditions as cocoa, but it is less demanding in its soil requirement (Famaye, 2012). However, according to Uguru, 2011, the most suitable soil for Kolanut cultivation is properly drained fertile soil which is also rich in humus.

Kolanut is particularly important in the religious customs as well as people's social life in Nigeria. It is a powerful cultural symbol which is a crucial part of local community meetings. It is also offered to elders to show respect and as a sacred offering. High premium is also placed on Kolanut especially during social functions such as naming and wedding ceremonies where it is used for entertainment of guests and visitors (Kanu, 2020).

Kolanut is chewed or masticated by people especially by elders as a stimulant. It excites the Central Nervous System (CNS) to produce one action or the other. There are widespread opinions that kolanut suppresses sleep, hunger and thirst (Chinweike *et al.,* 2020). In folkloric and traditional medicine, Kolanuts are utilised as parts of the treatments for illnesses such as rheumatism, asthma, whooping coughs, low libido, and parasitic infections (Asogwa *et al.,* 2011). There are about 50 species of kolanut and only 7 species are edible. However, *cola nitida* and *cola acuminata* are the two main species grown in Nigeria and commercially exploited. *Cola nitida* (Gbanja)which is regarded as kolanut of international and inter-regional trade is known to be the best and consumed

mainly by the northerners and some people from Southeastern Nigeria while *cola acuminata* is highly cherished and consumed by the Yoruba tribe (Asogwa *et al*., 2006).

Kolanut trade is the only livelihood and economic survival for many families involved in kola farming in Nigeria. Kola is also exported in large amounts to some African nations, Europe and America (Ugwu *et al*., 2020). As earlier stated, about 70% of the world Kolanut production comes from Nigeria but the production fluctuates from year to year since independence. Kolanut consumption is on the rise even though its production is declining because some of the Kolanut trees in Nigeria have very low yield. This could be adduced to poor natural pollination, overage trees, pests and diseases (Asogwa *et al*., 2006).

In terms of marketing, the marketing of freshly harvested Kolanuts is an activity carried out by the Kolanut farmers who sometimes sell their Kolanuts produce to buyers at village markets. They sometimes sell directly to wholesalers/retailers who are mostly women (Ajewole *et al.*, 2021). Eusebus (2004) also observed that farmers who are small farm holders in rural areas are associated with inadequate market information. The information needed by these farmers as well as marketers, include but not limited to government policies, storage, chemicals and markets.

The broad objective of the study was to determine the economic analysis of kolanuts in selected markets in Southwestern Nigeria. The specific objectives are to:

a. profile the socioeconomic characteristics of kolanut farmers,
b. determine kolanut processing and storage in the selected markets
c. determine the profitability of selected kolanut markets in the study area, and
d. determine the factors affecting kolanut marketing efficiency in the study area

METHODOLOGY

The study area is Nigeria. Two major kolanut markets were purposively selected. Gbongan in Osun state and Shagamu in Ogun State. One hundred and twelve kolanut marketers were randomly selected in Gbongan and 100 were selected in Shagamu. After sorting out for missing data in Gbongan 106 marketers' information was used. In Shagamu, after sorting out for missing data 96 marketers' information was used.

Descriptive statistics, marketing efficiency and linear regression. Descriptive statistics involved the use of means, frequencies and percentages.

Marketing efficiency = Output/Input. Linear Regression Analysis – this was used to determine the factors that affect the marketing efficiency of kolanut marketers.

The implicit model is:

$$Y_i=\beta_1X_1+\beta_2X_2+.....+\beta_pX_p+e_i \quad .....(i)$$

Where: Y= Marketing efficiency

e_i= error term

The X_is are Age of marketer, marital status, educational level, years of experience, type of kolanuts and price of kola.

RESULTS AND DISCUSSION

Socioeconomic characteristics

Table 1 presented the socioeconomic characteristics of kolanut marketers in Nigeria. Two markets were selected namely Gbongan and Shagamu. Fifty two percent of the marketers were from Gbongan market while 48% were from Shagamu market. Sixty eight percent of the marketers were between 31-60 years while 4% are ≤ 30years and 28% are above 60 years. The mean age of kolanut marketers is 52.4 ± 11.0. More than half of the marketers were in their active year still full of energy to do their marketing job. This age is to their advantage as they can work more and gain more profit. The ability to take risk and do manual work decrease as age increases (Ariyo *et al*., 2021; Nwawuisi *et al*., 2007). Eight out of ten kolanut marketers were married. Marriage is a great advantage to their marketing business as their spouses and children could greatly assist them (unpaid labour) (Albert *et al*., 2017). Seventy two percent of the marketers have at least a primary education. This revealed that they are literate, and education plays a key role in accepting new marketing skills and technology (Nwaru *et al*., 2004; Esiobu *et al*., 2014). All the kolanut marketers belonged to a social economic group. This would play a great role in improving their business and for all of them to belong to this group it showed that it has great benefits to them and their business. The mean years of experience for kolanut marketers in the study area was 26.9 ± 9.3 and 68% of them have 20-40 years' experience. Many years of experience in marketing would make them gather ideas that would be useful when challenges arise (Okoye *et al*., 2010). Fifty two percent of the marketers sold nitida and acuminata specie of kolanut while 48% of them sold only nitida spp.

The mean age of farmers in Gbongan was 53years, married (84.6%), had secondary education (46.1%), membership of a social economic group (100%), had 26years of experience in kola marketing and sold two varieties of kola namely *nitida* and *acuminata.* On the other hand, the mean age of kolanut farmers in Shagamu was 52years old, married (83.4%), had primary education (41.7%), belonged to a social economic group (100%), had 28 years of experience and markets *nitida* & *acuminata* specie of kolanut. Adewumi, 2003 reported that the mean age of kolanut marketers in Ekiti state was 50 years, this is like the age of kolanut marketers in Gbongan and Shagamu.

Table 1: Socio economic characteristics of kolanut marketers in the selected markets in Nigeria

Variable	Gbongan		Shagamu		Both market	
	Freq. %		Freq %		Freq	%
Kolanut Markets						
Gbongan	104	100			104	52.0
Shagamu	96	100	96	100	96	48.0
Age						
≤30	0	0.0	8	8.3	8	4.0
31-60	72	69.2	64	66.7	136	68.0
>60	32	30.8	24	25.0	56	28.0
Mean	53.2 ± 10.8		51.6 ± 11.2		52.4 ± 11.0	
Marital status						
Single	0	0.0	8	8.3	8	4.0
Married	88	84.6	80	83.4	168	84.0
Widow/widower	16	15.4	8	8.3	24	12.0
Educational level						
No formal education	24	23.1	32	33.3	56	28.0
Primary	32	30.8	40	41.7	72	36.0
Secondary	48	46.1	24	25.0	72	36.0
Membership of social economic group						
Yes	104	100.0	96	100	200	100
Years of experience						
10-20	32	30.8	32	33.3	64	32.0
21-30	40	38.5	40	41.7	80	40.0
31-40	32	30.8	24	25.0	56	28.0
Mean	26.3 ± 9.4		27.7 ± 7.9		26.9 ± 9.3	
Type of Kola						
Nitida	48	46.2	40	41.7	88	44
Nitida and Acumilata	56	53.8	56	58.3	112	56

Source: Field Survey, 2022

Kolanut processing and storage in the selected markets

Kolanut processing and storage was presented in Table 2. Activities in kolanut processing include soaking, peeling, storage and transport. All the marketers are involved in all these processes as they are all important to be done to kolanut before it can be fit for sale and consumption. The raw materials needed for kolanut processing are raw kolanut (kolanut with skin), water, paper, leaves, Gamallin (tari) and Phostocin. All the marketers need raw kolanuts before any processing can be done. Eighty eight percent of them need paper for processing, 64% use leaves while 56% and 88% of them use gamallin and phostocin chemicals respectively. Gamallin and Phostocin chemicals are dangerous to the body and thus there have been sensitization on the need for marketers not to use them. While carrying out this research, it was discovered that the marketers still use these chemicals.

Table 2: Kolanut processing and storage in selected markets in Nigeria

Variable	Freq.	%
Activities in kolanut processing operations		
Soaking	200	100
Peeling	200	100
Storage	200	100
Transport	200	100
Usage of raw materials in Kolanut Processing		
Raw Kolanuts (kolanuts with skin)	200	100
Water	128	64
Paper	176	88
Leaves	128	64
Gamallin (Tari)	112	56
Phostocin	176	88
Others	8	4

Source: Field Survey, 2022

Cost of operations in kolanut processing in the selected markets

The cost of operations in kolanut processing in the selected markets are presented in Table 3. The total cost and average cost incurred on soaking operation were ₦146,640 and ₦733.20 respectively. For kolanut peeling, the Total Cost (TC) and Average Total Cost (ATC) were ₦129,584 and ₦647.90 respectively. Also, for storage operation the TC and ATC incurred were ₦147,200 and ₦736 respectively while the TC and ATC for transportation were ₦211,664 and ₦1,058.30 respectively. The TC incurred on operations for kolanut processing was ₦635,088 and the ATC was ₦3,175.40.

Table 3: Cost of operations in kolanut processing in the selected markets

Operation	Total Cost (Naira)	Average Cost per marketer (Naira)
Soaking	146640	733.2
Peeling	129584	647.9
Storage	147200	736.0
Transportation	211664	1058.3
Total cost on processing	635088	3175.4

Source: Field Survey, 2022

Costs of materials used in kolanut processing

The costs of materials used in kolanut processing are presented in table 4. The TC and ATC expended on purchase of raw kolanuts were ₦7,025,624 and ₦35,128.10 respectively. For water the TC and ATC expended was ₦222,536 and ₦1,112.70 respectively. The TC and ATC expended on paper were ₦103,600 and ₦518. Also, for leaves the TC and ATC expended on leaves were ₦169,600 and ₦848. The TC and ATC spent on Gamallin (tari) were ₦58400 and ₦292 while for Phostocin the costs were ₦ 89,640 and ₦448.20 for TC and ATC respectively. The other costs of materials incurred in kolanut processing were ₦16,000 and ₦80. The TC and ATC of materials used for kolanut processing are ₦7,685,400 and ₦38,427.

Table 4: Cost of materials used in kolanut processing in the two markets

Materials	Total Cost (Naira)	Average cost per marketer
Raw kolanuts (kolanuts with skin)	7025624	35128.1
Water	222536	1112.7
Paper	103600	518
Leaves	169600	848
Gamallin (Tari)	58400	292
Phostocin	89640	448.2
Others (specify)	16000	80
Total cost of materials	7685400	38427

Source: Field Survey, 2022

Profitability of Kolanut in the selected markets

Total cost = ₦635088 + ₦7685400
= ₦8,320,488

The average total costs (cost of operations and cost of materials) incurred on kolanut was ₦41,602.

ATC = 3175 + 38427
= 41602

The Average Total Revenue of kolanut in the two selected markets was ₦399,860

Average Total Revenue on sale of kolanut per marketer = ₦399860

The profit an average marketer in the two selected markets was ₦358,258

Profit/ marketer = 399860-41602
= ₦358258

Efficiency = Output/Input
= 399860/41602
= 9.61
= 9.61

The efficiency of kolanut marketers in the selected markets was 9.61. This revealed that the output is 9.61 times more than the input. The kolanut marketing in the selected markets was efficient.

Cost of Operations in Gbongan and Shagamu markets

The cost of operations in kolanut processing in Gbongan and Shagamu market are presented in Table 5. The total cost and average cost incurred on soaking operation were ₦59,184 and ₦569 respectively in Gbongan while they were ₦87,456 and ₦911 in Shagamu. Marketers in Shagamu incurred more cost on soaking operation compared to Gbongan. For kolanut peeling in Gbongan, the TC and ATC were ₦54,784 and ₦526.80 while it was ₦74,800 and ₦779 in Shagamu. Marketers in Shagamu spent more than what marketers in Gbongan spent on peeling. Also, for storage operation the TC and ATC incurred were ₦34000 and ₦327 respectively in Gbongan while it

was ₦113200 and ₦1179 in Shagamu. For transportation cost the TC and ATC for transportation in Gbongan was ₦95,664 and ₦920 while it was ₦116,000 and ₦1,208 in Shagamu market. The TC incurred on operations for kolanut processing in Gbongan market was ₦ 243,632 and the ATC was ₦2343 while it was ₦391,456 and ₦4078 respectively, in Gbongan. Marketers in Shagamu incurred more cost in all the operations compared to their counterparts in Gbongan. This may be because Shagamu market is close to Lagos State thus things may be expensive there as it is in Lagos. Gbongan is situated in Osun State a relatively smaller and less metropolitan compared to Lagos state thus life here is relatively cheaper compared to Ogun and Lagos States.

Table 5: Cost of operations in kolanut processing in the selected markets in Nigeria

Gbongan			Shagamu	
Operation	Total Cost (Naira)	Average Cost per marketer (Naira)	Total Cost (Naira)	Average Cost per marketer (Naira)
Soaking	59184	569	87456	911
Peeling	54784	526.8	74800	779
Storage	34000	327	113200	1179
Transportation	95664	920	116000	1208
Total cost on processing	243632	2343	391456	4078

Source: Field Survey, 2022

Cost of operations in kolanut processing in Gbongan and Shagamu markets

The costs of operations in kolanut processing in the selected markets are presented in table 3. The total cost and average cost incurred on soaking operation was ₦146,640 and ₦733.20. For kolanut peeling the total cost and average cost was ₦129,584 and ₦647.90. Also, for storage operation the total cost and average cost incurred were ₦147,200 and ₦736 while the total cost and average cost for transportation were ₦211,664 and ₦1058.30. The total cost incurred on operations for kolanut processing were ₦635,088 and the average cost was ₦3,175.40.

The costs of materials used in kolanut processing in Gbongan and Shagamu markets were presented in table 4. The TC and ATC expended on purchase of raw kolanuts in Gbongan were ₦4,261,024 and ₦40,971 while for Shagamu it was ₦2,764,600 and ₦28,798. For water the TC and ATC expended in Gbongan was ₦114,920 and ₦1,105 while for Shagamu the TC was ₦107,616 and the ATC was ₦1,121. The TC and ATC expended on paper were ₦30,400 and ₦292 while for Shagamu the costs were ₦73,200 and ₦763. Also, for leaves the TC and ATC expended on leaves in Shagamu was ₦149,600 and ₦1,558 while for Gbongan the costs are ₦20,000 and ₦192. The TC and ATC spent on Gamallin (tari) in Shagamu were ₦148,600 and ₦154 and for Gbongan the costs were ₦43,600 and ₦419. For phostocin the costs in Gbongan were ₦535,000 and ₦337 while for shagamu the costs were ₦546,400 and ₦5,690. The TC and ATC of other materials used for kolanut processing in Gbongan were ₦4,520,944 and ₦43,471 while for Shagamu it was ₦3,164,456 & ₦31,974. The cost of materials in Gbongan is higher than that of Shagamu market. In the case of cost of operations, costs at Shagamu is higher than that of Gbongan. Reverse is the case for cost of materials.

Table 6: Cost of materials used in Kolanut processing in selected markets in Nigeria

Gbongan			Shagamu	
Materials	Total Cost (Naira)	Average cost per marketer	Total Cost (Naira)	Average cost per marketer
Raw kolanuts (kolanuts with skin)	4261024	40971	2764600	28798
Water	114920	1105	107616	1121
Paper	30400	292	73200	763
Leaves	20000	192	149600	1558
Gamallin (Tari)	43600	419	14800	154
Phostocin	35000	337	54640	569
Total cost of materials	4520944	43471	3164456	31974

Source: Field Survey, 2022

Marketing efficiency of kolanut marketers in Gbongan and Shagamu Markets

Gbongan

Average Total Cost = 2343 + 43471

= 45813/25

= 1833

Average Total revenue on sale of kolanut per marketer/kg= 12478

Profit per marketer = 12478 -1833
= 10645
Efficiency =Output/Input
= 12478/1833
= 5.80

In Gbongan, a kolanut marketer produces six times of what was used as input. A marketer in Gbongan is efficient.

Shagamu

Average Total Cost /kg = 4078 +31974
= 36052
= 1442
Average Total revenue on sale of kolanut per marketer/ kg= 19803
Profitper marketer/kg =19803-1442
= 18361
Efficiency =output/input X 100
= 18361 / 1442
= 12.73

In Shagamu a kolanut marketer produces thirteen times of what was used as input. This means that the output is 12.73 times more than the input. A marketer in Shagamu market is efficient.

Determinants of marketing efficiency in Gbongan Market

Table 7 shows the result of the linear regression analysis of determinants of efficiency in Gbongan kolanut market. Linear regression was used because it has the highest R^2 compared to the other functional forms (double log, semi-log and exponential). The result shows that the regressors can explain 85.9% of the variations in the dependant variables, that is, the coefficient of determination (R^2) was 85.9%. The coefficients for age, marital status, educational level, experience in kolanut marketing, type of kolanut and the price of kolanut per kg were all significant. An increase in the age of a marketer by 1year would reduce the efficiency of kolanut marketing. An improvement in the marital status of a marketer would increase marketers' efficiency. This is in line with the socioeconomic characteristics where most of the marketers were married. Their spouses and children help with the business. The type of kolanut used also reduced efficiency while price increases efficiency even though the coefficient is very small.

Table 7: Determinants of Efficiency in Gbongan kolanut market

Variable	Coefficient	S.E	P> |t|
Age	-1.513***	0.1846	0.000
Marital status	17.0437***	1.2491	0.000
Educational Level	-7.009***	1.2327	0.000
Experience in kola marketing	-0.3483**	0.1556	0.028
Type of Kola	-17.6430***	2.8534	0.000
Price per kg	0.00003***	0.0023	0.000
Constant	106.1183***	17.5390	0.000
R	0.8598***		0.000

Source: Field Survey, 2022 ***, **, * 1%, 5% and 10% level of significance

Determinants of efficiency in kolanut market in Shagamu market

Table 8 presented the result of the regression analysis of determinants of efficiency in Shagamu kolanut market. The result shows that the regressors can explain 93.4% of the variations in the dependant variables, that is, the coefficient of determination (R^2) was 93.4%. The coefficients for age, marital status, educational level, type of kolanut and the price of kolanut per kg were all significant. An increase in the age of a marketer by 1year would reduce the efficiency of kolanut marketing. An improvement in the marital status of a marketer would increase marketers' efficiency. This is in line with the socioeconomic characteristics where most of the marketers were married. Their spouses and children help with the business. The type of kolanut used also reduced efficiency while price increases efficiency even though the coefficient is very small

Table 8: Determinants of Efficiency in Shagamu kolanut market.

Variable	Coefficient	S.E	P> |t|
Age	-1.8125***	0.2058	0.000
Marital Status	13.9089***	2.5171	0.000
Educational level	-10.8687***	3.7235	0.005
Experience in Kola Marketing	0.1547	0.2375	0.517
Type of Kolanut	-10.6798***	2.8317	0.000
Price per kg	0.0001***	0.0004	0.000
Constant	87.0764***	20.8480	0.000
R	0.9344***		0.000

Source: Field Survey, 2022 ***, **, * 1%, 5% and 10% level of significance

CONCLUSION

Kolanut marketers in selected markets in Nigeria are efficient. Marketers in Shagamu are more efficient than marketers in Gbongan**.** The lowness in the marketing efficiency at Gbongan market might be due to the fact that more average cost of materials, which was N43,471 was incurred in Gbongan compared to that of Shagamu which was N31,974. Hence, increase in average cost of materials reduced the efficiency of Gbongan market. Apart from this, the mean age of kolanut marketers at Shagamu market was relatively lower than that of Gbongan market, and the lower the age of the kolanut marketers, the higher the efficiency. In the two markets,marketers were using chemicals (gamallin and phostocin) to preserve kolanuts and these chemicals are harmful to the people that consume kolanut and this could also reduce the marketing efficiency in the selected markets. This is because some kolanut consumers will be skeptical about the kolanut consumption because of the chemicals used to preserve it and this could reduce the marketing efficiency. However, in order to avert the problems that may result from chemical preservation, some kolanut marketers were using local materials such as lime, leaves and nylon to preserve their produce. The determinants of marketing efficiency in the selected markets are age, educational level, marital status, type of kola and price of kolanut. The study however recommended that local botanicals should be developed in place of chemicals to preserve kolanuts. Also, kolanut market infrastructures should be properly developed to enhance higher efficiency.

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